THE OIL WEEKLY

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The Oil Man's Calendar

DEC. 2	New Mexico Oil and Gas Association, Artesia Hotel, Artesia.
17	Petroleum Accountants Society of Oklahoma, Tulsa.
18-19	Interstate Oil Compact Commission, Oklahoma City.
FEB. 15-18	American Institute of Mining and Metallurgical Engineers, New York.
APR. 7- 9	American Association of Petroleum Geologists, Fort Worth, Texas.
8- 9	American Petroleum Institute, Eastern District, Pittsburgh.

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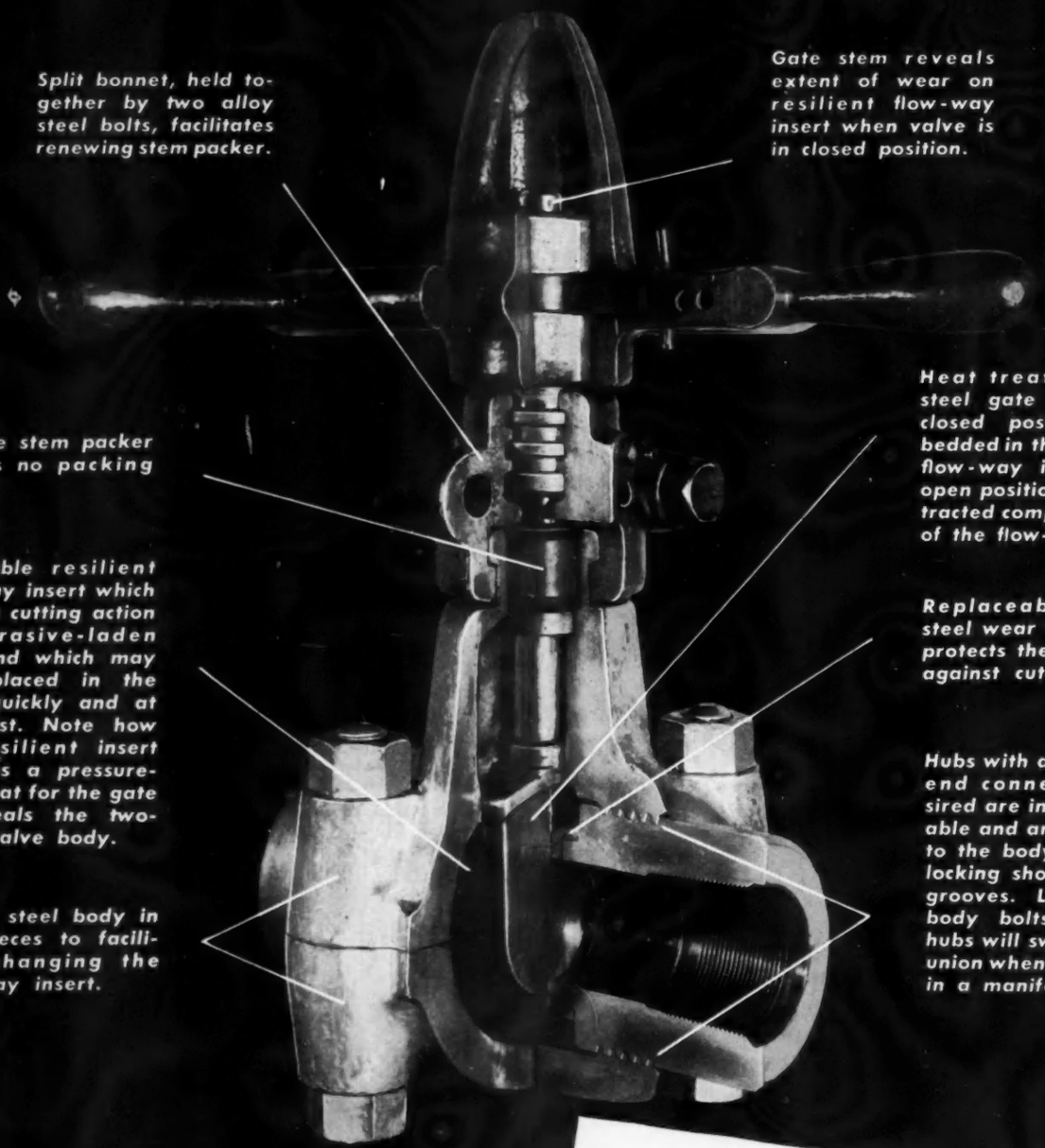

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The Changing Panorama

Big Black Market In East Coast

APPROXIMATELY half of the 139,000-barrel per day deficiency in East Coast petroleum supplies is said to be the result of "black market" operations. Thus a great saving could be achieved by an all-out campaign against gasoline "bootlegging," now amounting to an estimated 70,000 barrels a day or more.

Investigations already made in various Eastern communities disclosed that illegal operations are prevalent. Violations were found in 10 of 14 filling stations visited in Washington, and in Maryland prosecutions were under consideration in some three score cases where filling stations have been selling gasoline without asking for coupons, or accepting coupons of types to which the purchaser was not entitled, or accepting counterfeit coupons.

It was found that some operators early in November held quantities of "No. 3" coupons although they were not usable until after November 21, and that some had purchased "S" coupons from truck drivers and others who themselves would not need all their gasoline quota before the expiration date of the coupons.

While the East Coast "black market" is estimated at 70,000 barrels a day, that is merely the amount by which consumption exceeds the figure set as the rationed demand. Consequently, there is considerable doubt as to whether the legal rationed demand may not be less than the estimate, and therefore that the volume of "black" sales even larger.

If this situation can exist in the East Coast, where refineries and filling stations are usually larger than in other parts of the country, the problem of a "black market" probably will be multiplied several fold when nationwide rationing is imposed next week.

Accident Prevention Can Save Manpower

AMERICA is organizing the greatest counter-attack on accidents in history. Faced by mounting casualties on the home front already exceeding those on the fighting front, the country is taking unified action to curb the sabotage of manpower by accident.

Since Pearl Harbor 85,000 persons have been killed by accident in the United States, and 7,700,000 have been injured. Destruction of human material on such a grand scale means something more than personal tragedy endlessly repeated. It means that 410,000,000 man-days of work have been lost since Pearl Harbor. These man-days might better have been spent turning out tanks, planes, guns, ships and the thousand and one complementary materials of war.

Of these fatalities 42,000 were workers—at a time when manpower is a major problem of the nation. Only one out of eight industrial establishments (there are 196,000 in all) is fully covered by a safety program. Even more alarming, three out of five workers injured were struck down not in line of duty at furnace, lathe or drilling rig, but off the job.

President Roosevelt has called on the National Safety Council "to mobilize its nationwide resources in leading a concerted and intensified campaign against accidents." This 30-year old council has invaluable experience to draw on, but to move into wartime high gear with a program big enough to meet the national accident crisis, money for an adequate emergency budget is needed. Industrial leaders have undertaken the financing of the council's big assignments, and through an organization known as the War Production Fund to Conserve Manpower is attempting to raise $5,000,000. At present regional campaigns are getting under way in major industrial centers from coast to coast.

For the first time in history, an accident prevention movement with the scope, leadership and momentum required to meet the actual needs of the nation is under way.

Priority Free Paper Pipe

A NEW priority-free pipe, which can replace steel tubing for a number of important uses including oil field seismograph shot hole work, has been developed. The new material consists of layers of paper impregnated with a synthetic resin and subject to a pressure of 1500 pounds. The pipe is strong enough to support the weight of three or four men standing on a 12-foot section, and so light that one man can carry half a dozen 12-foot lengths.

Salary Limitation Hits Few Oil Men

FUROR over President Roosevelt's order placing a ceiling on salaries of $25,000 after federal taxes and certain allowances is still loud, but its momentum is slackening under the discovery that probably not more than 3000 persons will be affected.

While the fact that it affects only a small number of persons does not detract from any inequity which may be inherent in the order, it is serving as a deterrent to the popular protest which was expected.

While net salaries are limited to $25,000, it has been pointed out, gross salaries (before taxes and allowances are deducted) may be somewhere in the neighborhood of $67,200, and this difference in amount will serve to relieve some 20,000 persons who first feared they would be covered by the order.

So far as the petroleum industry is concerned, it is believed that the number of persons affected will be very small, possibly not more than a score or so. Most widely affected will be members of the movie industry, where six-figure salaries are commonplace and where the largest salary in the country —over $700,000—was reported for last year.

Despite the fact that the scope of the order is restricted, there will be a determined drive in Congress next year for its repeal. Basis for the Congressional attack will be the refusal of both Senate and House to accept the President's recommendation for a limitation on salaries. The order, it is charged, is aimed purely at "social reform"; reportedly, the idea was originated in the CIO and passed on to Mrs. Roosevelt who "sold" the President on it.

A demand for repeal of the act under which the order was issued was submitted to Chairman Walter F. George of the Senate Finance Committee last week by the Committee for Constitutional Government, which charged the purpose of the limitation was "not to raise revenue or curb inflation by taxation, but to win and uphold support of radical labor organizers and to further a program to redistribute the wealth of America by executive decree."

"This executive order," the committee declared, "is a blow at the private enterprise system which is the foundation

of our constitutional liberties. Our high production, high wages, leisure and national well being are the result of invention, machinery, managerial organization, all products of individual men. As these leaders served consumers, giving more for less, they made profits which supplied and attracted capital that makes possible private enterprise. A $25,000 ceiling and equalitarian viewpoint prompting it will, if not rejected, soon paralyze these very forces which have served as the mainspring of our progress."

Also Worth Fighting For

ONE of the heartening notes of the Tweny-Third Annual Meeting of the American Petroleum Institute was the frequent reiteration of the soundness of the principle of free enterprise. This came from individuals in government as well as from individuals within the industry. Harold L. Ickes, Petroleum Coordinator for War, was outspoken in his allegiance to the desirability of clinging to competition. Ralph K. Davies, Deputy Coordinator, likewise gave it approval. The two as well as others went even further by expressing the hope that stimulation of the search for reserves of petroleum will not bring subsidy from the government.

Concern over the issue of free enterprise came to the front because of the recent directive by which facilities of the petroleum industry have been pooled under direction of the government. Its justification comes from the necessities of prosecuting the war. The convictions within government that the directive is emergency in nature is hopeful.

No one can object to action which is taken as military assistance, unless the action fails of its objective. Since Directive 59 is not failing in its objective, the petroleum industry is correct in its determination to accept the order as beneficial to the war effort and for only the duration of the war.

It is advisable, however, not to dismiss the issue. Efforts within official Washington to socialize business have been too numerous in the past 10 years to justify the assumption that this has died in the war effort. It is more likely that it is dormant.

Men still believe that competition is extravagant and unnecessary. A conviction may be unsound and still prevail. Europe has systems contrary to the logic that supports free enterprise, still the systems prevail.

Free enterprise, another description of competition, offers the prospect of extravagance in that there is duplication of facilities, duplication of service, duplication of technical study. Extravagance fades whenever this competition results in better merchandise and better service at lower costs. Fortunately the petroleum industry can cite this result despite all its duplication of effort.

Monopoly is not efficient for the reason that it is not forced to improve either merchandise or service. It holds all the market regardless of what it produces or how it distributes its wares. Two refining plants do not exist where one seems sufficient. Two grades of gasoline are not offered where one is adequate.

Unfortunately the monopoly is blind. All too late it discovers competition across some boundary or across some ocean. The Axis nations are an example of monopolistic blindness. In neither Germany nor Japan was there immediate necessity for producing 100-octane aviation gasoline, to mention just one instance. Competition existed but not at home. Consequently the efficiency of monopoly faces the disaster of the extravagance of competition.

A monopoly of government is less efficient than a commercial monopoly. When under complete domination by the state, a monopoly does not face the necessity of making a profit. What it does becomes routine and it lags from technology to service.

Its own accomplishments plus the examples of blindness in Axis economy are on the side of the petroleum industry as it maintains its claim of the right to duplicate facilities and technology while it discards equipment and makes progress. The petroleum industry will be within its rights as well as within its duties to the nation if it safeguards the principle of free enterprise.

Widespread Tubeless Tire Tests Underway

EXHAUSTIVE practical tests of the tubeless tire, which may add more than 200,000 tons of high-grade rubber in the form of existing inner tubes to the nation's scrap rubber stockpile, are under way on about 1000 oil company cars all over the country.

No conclusions will be reached until the tests are completed, but a few preliminary reports to the Petroleum Industry War Council, under whose auspices the tests are being made, have revealed nothing to disprove the practicability of the idea of removing the inner tubes. Virtually all makes of cars and tires are being tested in all parts of the country and under all sorts of operating conditions. The 35-mile speed limit and gasoline rationing are expected to delay completion of the tests, which call for at least 2000 miles per car, until about the end of December.

Almost daily women are being trained to perform oil-field duties formerly reserved entirely for men. United Gas Company is training six women to fire boilers. As trainees they will work with the regular firemen for a period of three months and if able to handle the job at the end of that time, will be placed as regular firemen at gasoline plants as men are called to military service.

Gasoline Tax Income Continues to Drop

Federal gasoline-tax collections in October were under the corresponding period last year for the sixth successive month, amounting to $31,622,227 against $35,711,794, but exceeded by more than $2,000,000 the September receipts of $29,204,879, it is shown by the monthly report of the Internal Revenue Bureau.

For the 10 months ended with October, the bureau announced, collections aggregated $287,512,520 against $310,311,243 for the same period in 1941.

Lubricating oil taxes also were above those of the preceding month and were close to the 1941 figure, amounting to $3,266,338 against $2,933,417 in September and $3,603,176 in October of last year, and for the 10 months were $33,565,949 against $36,135,200, it was stated.

Taxes on pipe-line transportation amounted to $1,113,175 for October, compared with $1,046,176 for September and $1,144,568 for October, 1941.

WASHINGTON ROUNDUP

By B. F. LINZ
Washington Correspondent

Bitter Behind Scene Fight for Control of WPB and OPC

Oil Problems and Needs Told to Congress Committees

Gasoline Rationing to Start Despite Opposition

OUTSTANDING subject of discussion during the week was the impending nation-wide gasoline rationing, the subject of inquiry by two Congressional committees and under attack in both Senate and House.

An anti-rationing House bloc, claiming 147 members over the week-end was striving to pass legislation postponing the extension of rationing for three months and a similar move was underway in the Senate, opposed by Rubber Director William Jeffers and Price Administrator Leon Henderson who were supported by President Roosevelt in their demand that nothing interfere with the December 1 order of OPA.

At hearings before the oil group of the House Interstate and Foreign Commerce Committee and later before the Senate Committee Investigating the progress of the national defense, Jeffers and Henderson strongly defended gasoline rationing as a rubber-conservation measure. Before the former, also, OPC officials and representatives of the industry made a strong fight for an increase in crude prices as the best possible incentive to accelerated exploration and development.

As the gasoline controversy waged hotter, an equally bitter fight for control of oil was being waged behind the scenes, with Ferdinand Eberstadt, WPB vice chairman on program determination, reported attempting to wrest control of the War Production Board from Donald M. Nelson and at the same time take over the Office of Petroleum Coordinator.

The fight was said to have been the cause of delay in the signing by the President of the executive order setting up the Petroleum Administration for War with Coordinator Ickes as head man.

Rail deliveries to Eastern territory declined 2.1 percent during the week ended November 21, averaging 768,749 barrels a day.

East Coast Crisis

A first-class crisis appeared in the making in the East as officials predicted that the oil requirements of our military forces in Africa would reach astronomical proportions, with most of the tonnage moving from north Atlantic ports to escape one submarine zone and speed up delivery.

No one would hazard a guess as to how badly the movement of this oil would interfere with the civilian supply, but all sorts of expedients to cut consumption were said to be under consideration, including a "curfew" on places of amusement, the closing of schools and a still further cut in home heating allowables, already reduced one-third from last year.

Failure to adopt an allocations program for oil before the emergency arose now is admitted in some official quarters to be responsible for the present critical situation, but if military demands continue to increase at their present rate further restrictions on civilian uses are inevitable.

☆

CONTROL: A bitter behind-the-scenes fight for control of oil is being waged, with Ferdinand Eberstadt, vice chairman of WPB to which his appointment was engineered by Lieutenant General Brehon B. Somervell of the Services of Supply, represented as attempting to take over OPC and incidentally to swallow the whole WPB.

Eberstadt, a strong supporter of army control of the board (he was formerly chairman of the army and navy munitions board) has steadily increased his influence in WPB, where he has the last say on practically every important matter. He has, for instance, the final word on allocations for the "big inch" pipe line and other projects of the oil industry.

Groundwork for the reorganization was laid in long newspaper stories in which an unidentified high official called for a more forceful administration of the oil problem and charged Ickes with having failed to foresee the present situation. Some of these stories were said to have been written after conversations with Eberstadt.

Other stories in the press talked of a cabinet shakeup, with Ickes taking over the manpower organization.

The controversy is said to have been responsible for delay in the signing of the executive order which would convert OPC into the Petroleum Administration for War and strengthen Ickes' hands. At the same time, President Roosevelt is said to be supporting Nelson in his resistance to increased army influence in WPB and, in line with that position, to be reluctant to the shifting of OPC.

OPC Staff Would Quit

There is considerable speculation as to what would happen to the top-flight organization Ickes has built up if OPC were taken over, with some quarters declaring that many of the industry men on Ickes' staff would pack up and go home rather than go over to WPB.

The need for more centralized control of the oil situation has been stressed over a considerable period and the President himself has repeatedly admitted that it would be desirable. But for practically the same length of time there has been a fight as to who should exercise the control, which has prevented Roosevelt from taking definite action.

An executive order setting up an oil administrator and giving him increased authority over the allocation of materials, the crux of the whole situation, has been on the President's desk for some days, but WPB interests are said to have opposed its issuance and the consequent loss of authority to their organization.

At no time have the relations between OPC, WPB and OPA been more than fleetingly friendly, and when he appeared before the House Oil Subcommittee, Ickes laid the failure to get the "big inch" and butadiene programs through on schedule to the refusal of WPB to grant the necessary priorities in time. Similarly, there have been intimations that the refusal of OPA to

grant increases in the crude price has been responsible for the dangerous reserve situation.

☆

PIPE LINE: Despite adverse weather conditions, the "big inch" pipe line advanced 70 miles during the past two weeks and OPC officials still are hopeful that, barring further setbacks, the Longview-Norris City project will be in operation early in January.

More than 465 miles of line is in the trench and the unfinished river crossings are nearing completion, and two contractors are preparing to move their crews and equipment to sites along the second leg, it was disclosed by Deputy Coordinator Davies. Construction of ten pump stations is progressing rapidly, he said, and the building of tanks at Longview and facilities at Norris City is under way.

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RATIONING: Members of House and Senate united during the week in an all-out attack upon expansion of gasoline rationing, creating a situation which influenced President Roosevelt to intervene that the need for nation-wide restrictions on driving was imperative and should be met December 1, as planned by OPA.

In both Houses of Congress legislation was pending to delay the rationing program, and in the Senate Clark of Missouri, Reed, Thomas of Oklahoma, Gillette, Connally, Truman and Capper joined in a resolution calling for a special five-man investigation of the whole fuel situation in the region between the Mississippi River and the Rocky Mountains, from Canada to Mexico.

Proponents of measures attacking the rationing program asserted that they have enough votes in each House to insure enactment, but there was little possibility that a measure ordering delay could be passed before the December 1 deadline or, if enacted, would be signed by the President.

Roosevelt aligned himself behind Jeffers and Henderson in identical letters to those officials, in which he stressed the vital necessity of conserving every possible ounce of rubber.

"We must do everything within our power to see that the program starts December 1, because victory must not be delayed through failure to support our fighting forces," he said.

Upon receipt of the letter, both Jeffers and Henderson went on the radio with an attack upon selfish groups which they charged were behind the campaign against rationing.

Jeffers assured the people that rationing is not designed to keep them from getting to and from work but, rather, to insure their ability to do so, and charged that "some downtown merchants and some gasoline jobbers" were misleading them regarding the purpose of the program. Henderson made the flat statement that rationing "will definitely" go into effect December 1 and denounced opponents as "men who would gamble America's future, not for a mess of pottage, but for a gallon of gasoline."

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RUSSIAN SALE: Sale of the Douglas Oil Refinery, near Los Angeles, to the government for shipment to Russia under the lend-lease program, was announced November 23 by the Office of War Information.

The price to be paid for the plant was not disclosed but reportedly was $1,900,000.

It was stated that the plant is a medium-sized refinery producing 87-octane gasoline, completed a little more than a year ago, and was purchased as part of a program for sending between $15,000,000 and $20,000,000 worth of refinery equipment to the Soviet Republic, the balance, partly new and partly used equipment, now being in the engineering and procurement stage.

Purpose of the program is to assist Russia to replace such of its refining capacity as has been lost in the fighting on the Russian front.

☆

PUBLIC LANDS: Over the opposition of the petroleum coordinator, the Senate on November 23 passed the O'Mahoney bill to encourage exploration on the public lands and sent the measure to the House of Representatives, where an effort will be made to secure its passage before the adjournment of the Congress next month.

On the basis of hearings before his subcommittee last month, Senator O'Mahoney called the bill up for consideration with an amendment providing that until the end of the war the Secretary of the Interior may issue leases or revise existing leases to carry a royalty for the first ten years of not exceeding 7½ percent on tracts of not more than 40 acres.

The bill provides that the royalty for the initial ten years of all other leases on the public domain shall be not more than 12½ percent.

Committees Told Higher Prices Only Way To Improve Sagging Oil Reserves

INVESTIGATORY groups on both sides of the Capitol undertook new studies of the oil situation during the week, the oil group of the House Interstate and Foreign Commerce Committee leading off November 23 with a survey of the industry's situation and the Truman Senate Committee to investigate the progress of the defense program following November 27 with the first of a series of hearings on gasoline rationing.

On Thanksgiving eve the subcommittee recessed its hearings until November 30 and the day following the holiday the Truman committee began to Traverse practically the same ground, with Jeffers repeating his testimony on the rubber supply and the need for rationing to protect it.

The rubber administrator assured the committee that a common sense effort would be made to determine the essential needs of various groups affected by nationwide rationing, and indicated that more generous provision would be made for persons in the West, where distances of travel are greater.

The Truman committee plans to go to Kansas City within a few days to hear Midwestern mayors, civic officials and representatives of oil companies.

The Senate hearing was designed to probe the necessity for nationwide rationing and, in announcing his investigation, Chairman Truman of Missouri urged westerners to obey the rules which go into effect December 1, at least for 10 days, which he said he expected would be sufficient for his committee to develop all the facts.

The House subcommittee, under the leadership of Committee Chairman Clarence F. Lea of California, who took the helm when Representative William P. Cole, Jr., of Maryland, resigned, opened its study with a hearing behind closed doors of the supply and demand for military uses.

Testifying at the executive session were Brigadier General Walter B. Pyron, Captain A. F. Carter, U.S.N., Price Administrator Leon Henderson and representatives of the War Production Board. Neither officials nor committee members would comment on the mili-

tary situation, but there were indications that the testimony was consistent with that given before the Senate Public Lands subcommittee at its "round table" sessions last month (see THE OIL WEEKLY, October 12).

First witness to testify at the open hearings which followed the executive session was Deputy Coordinator Ralph K. Davies, who warned the subcommittee at the outset against attempting to build up any definite figures on supply, demand, future possibilites.

Few Facts on Supply

"There are but few facts which can be stated unconditionally," Davies said, "qualification of one kind or another is almost always necessary. There is very little that is susceptible of consideration free of other related situations. For example, when we speak of production capacity in the case of crude oil, we must condition our appraisal upon the availability of materials which we do not control; when we talk of supplies in one place or another, we must qualify our statements with assumptions as to transportation facilities, as ships, cars or locomotives. When we forecast the future, we must base our estimates upon guesses as to the probable requirements of vast industrial and military operations—upon the future course of the war itself. Carefully considered guesses of experts, yes — but guesses nevertheless."

Davies' caution followed an explanation by Lea of the purposes of the hearing—the final one of this Congress—to bring up to date the facts as to oil problems and their ramifications, including production, transportation and distribution, price ceilings, subsidies, the relation of oil to the use of rubber and rationing. Also, he said, the committee hoped to receive suggestions for improvement of the present administration and handling of oil problems by the government.

The deputy coordinator, paying high tribute to the subcommittee's work of the past nine years, expressed the hope that it might be continued indefinitely, in order that Congress, the government agencies and the industry may have the benefit of experience which cannot be duplicated by any other body in Congress.

Commenting that the subcommittee had been advised in its executive session of the extent of the military demand for oil, Davies assured that at present "we are supplying the full oil requirement of industry, of the military forces and, to the extent that transportation facilities are available, the civilian demand," and in addition are meeting the demands of our own and allied forces overseas.

"This represents an enormous volume," he said. "I am not free to state publicly, of course, the extent of the military demand, but I can say that in comparison with the oil demand in the last war, one single product today exceeds by a substantial margin the sum total of petroleum demand in 1918—for ourselves and our allies. And the industrial and civilian requirement, as everyone knows, is proportionately enlarged over what it was at that time.

"The vital question, of course, is whether or not the oil industry of America can continue to meet the mounting demand. In general terms I should like to give as my opinion that provided the required materials are made available to the industry oil need not be the limiting factor in military plans or our essential industrial and civilian operations."

However, he stressed, while it "need" not be it "could" be, and no one should entertain the idea that we have plenty of oil and therefore there is no problem.

"Nothing could be further from the fact," he emphasized. "Actually a very great deal must be done if we are to produce and refine a sufficient quantity of the particular grades and the particular products.

"Above all else when we consider the adequacy of the future oil supply, we must recognize the fact that each day our known reserves of crude are being drawn upon to the tune of over 4,000,000 barrels, and that the only offsets to this rate of depletion are the current discoveries of new deposits and conservation by improved methods of those now developed. Only by getting more oil from the fields we have, or finding more fields, do we balance our oil ledger and assure adequacy of supply for the future."

Davies pointed out that the discovery picture is not now satisfactory but said he would leave it to E. DeGolyer, head of the production division, to develop more fully.

Prices

"On only one phase of this question do I want to make a general statement—the question of price," he continued. "There is today a considerable and a growing opinion in oil industry circles that the prevailing price ceilings as to oil are too low to accomplish the production results which are essential if the full responsibilities of oil in the war are to be met. The assertion is made that existing price levels are insufficient to supply the required incentive for exploratory effort or to protect against deterioration or abandonment of properties now producing on a stripper basis.

"The OPC is fully aware of this trend of thought, in fact has before it resolutions from industry organizations including the PIWC urging increases. It is also informed as to suggestions which have been advanced by agencies of the government as to subsidy payments in lieu of customary price adjustments. These various proposals are undergoing study in our office at the present time and we shall hope to formulate recommendations for the price administrator who has the responsibility for decision in these matters of prices. At the moment we have no conviction and no statement to make beyond saying that existing price schedules we think should be reviewed in the light of higher costs, declining reserves, new tax regulations and so forth. Some conclusion should then be reached on the facts as to whether present price ceilings are, or are not, sound, all factors considered."

Manpower

Another serious problem which is becoming more acute is that of manpower, Davies told the subcommittee. Pointing out that operations of the industry require men of technical skill, he pointed out there is no purpose in talking about increased exploratory effort and more drilling or in building more plants unless men are available to do the work. The problem is further complicated, he said, by the fact that a great number of the industry's technical men are young and anxious to be in the armed services. "It is obvious, of course," he stressed, "that these men will best serve their country where they are and should be kept there. But so saying is not sufficient; we must find means of enforcing some such policy."

Davies went into the East Coast supply situation in detail from the angle of the conflicting and confusing statements which have appeared in the press, declared that OPC has complete information and has been thoroughly consistent in its informational announcements and suggested that credence be given only to reports emanating from that agency.

"The work of adjusting the economy of oil to the requirements of the nation at war can only succeed in the full sense given the complete cooperation of the industry," he concluded. "The government could not hope to put together any organization which could supplant that built by industry over the past 75 years. This the coordinator has recognized from the outset and our work has been undertaken therefore in the spirit of a wartime partnership between industry and government—brought together to make oil do its full part in winning the war. I am happy to attest here to the fact that the cooperation of the partners has left nothing to be desired.

"From where I view the operation, I can see great difficulties ahead, problems no end, and nothing but hard work

to look forward to—but with success attainable."

Questioning of Davies by members of the subcommittee was confined to the question of price, with Representative Wolverton of New Jersey attempting to ascertain whether OPC believes a general increase should be made in the price of crude for the purpose of keeping stripper wells in operation and accelerating exploration, to the benefit of companies with flush production and at increase cost to the public. Davies insisted that he has no convictions at the moment and refused to take a definite position pending completion of the studies now being made.

He told Wolverton, however, that there are many other factors than those mentioned by the congressman in a decision as to price increases—the effect of taxes is one of considerable importance, and the desirability of subsidies as an alternative, among them.

Subsidies for new production, he said, are being resisted by the industry, which never has liked the idea of a subsidy. "Personally," he added, "I am skeptical as to the subsidy being the answer, but have not formed any conviction."

Search Not Diminished

The search for new discoveries has not diminished, he said, but the results are less promising; as many wildcats are being drilled but the return is smaller, "which means to us that we need to drill even more wildcats regardless of whatever we have done in the past."

Wolverton suggested that too much emphasis is being given to stripper wells, which amount in number to about 75 percent of total wells but account for only 20 to 25 percent of the production, but it was pointed out by DeGolyer that these wells are a vitally important segment of the industry.

Following Davies, DeGolyer told the subcommittee that the capacity to produce is regarded as confidential and no figures could be disclosed, but that 1.2 percent of the 1941 production was from fields discovered in the previous year; 5.8 percent from fields discovered two years before, and 11.5 percent from fields discovered three years earlier.

DeGolyer reviewed the discovery record over a period of years, and said OPC aimed at 4000 wildcats this year and will get 3000.

"It appears that some extraordinary effort must be made to step up our exploratory drilling," he said. "In my opinion it is far more important that a large number of wildcat wells be drilled at the present time than it has been for many years in the past."

He explained that the industry expects that future discoveries will be smaller structure than those in the past, that "we are about out of structural prospects and must depend increasingly upon the discovery of stratigraphic trap types of occurrence." This requires much greater drilling for discovery than the structural type, he said.

The history of the industry, he said, has been that there is a lull in prospecting activity when methods of exploration available show signs of failing, but at all times prospecting depends on the financial ability and the willingness of the wildcatter to take the risk and upon the attractiveness of the prospect available to him.

Secondary Recovery

DeGolyer cited as essential to the health of the industry the maximum conservation of existing fields and adoption of secondary recovery methods wherever possible. The latter, he said, gives promise, on the basis of studies, of adding 2,014,000,000 barrels of oil to the possible recovery from areas where the estimate had been for 1,335,000,000 barrels. In Texas, 911,000,000 barrels may be added to reserves and daily productive capacity increased if secondary recovery methods are put into operation in areas now believed to present favorable conditions.

The production chief explained that the situation is made difficult by the curbs which it has been necessary to impose on the use of materials, but said OPC has a minimum program for 1943 drilling of approximately 16,000 wells which will cost approximately 1,200,000 tons of steel and other materials. About 19,000 wells will be drilled this year, he said.

"This is a restricted program," he explained. "We will strive to make it serve but we are near the point where oil in addition to our estimated productive capacity can be secured only by a direct expenditure of critical materials."

Members of the subcommittee also questioned DeGolyer about price increases, and he disclosed that OPC is preparing to make a recommendation to OPA for an increase in the price of California oil to encourage the production of heavy oil badly needed for military purposes. He explained that a stripper well in Pennsylvania can continue to operate on $1.25 or $1.50 per barrel, but that the heavy California oil carries a price of only 80 cents.

Wolverton, going into the exploration situation, asked whether some advantage would not be derived if the government put technical crews into the field, but DeGolyer explained that the industry now is using practically all the skilled men and equipment available.

The war-induced problems of the refining branch of the industry were outlined for the subcommittee by Assistant Deputy Coordinator Bruce K. Brown, who disclosed that it is hoped that storage space may be provided for any gasoline which becomes excess as a result of rationing.

Brown explained that the revolutionary changes in refinery operations resulting from the switching of major demand from motor gasoline to high octane and demands for military products not formerly produced in great quantities, while fuel oil requirements continue high, has raised economic problems of grave importance.

The refiners, he said, are finding it difficult to do economically what they can do physically.

He went into the refinery situation at length, dealing with the materials problem which is making difficult the conversion of some plants and the construction of others, and explained the program of OPC to put the refining branch of the industry on a complete wartime basis.

Future Productivity Studied

At its November 24 session the subcommittee evidenced concern over the future, questioning witnesses as to how the industry would go about increasing production if military demand a year hence required an additional daily output of 1,000,000 barrels.

Its questions along that line were directed to Alfred Jacobsen, president of Amerada Petroleum Corporation, who suggested that production could be increased without seriously affecting ultimate recovery by raising the output in West Texas, New Mexico and some parts of Louisiana, which would require the building of additional pipe lines and by closer well drilling in some fields, which would involve critical materials, and by stepping up wildcatting.

Subsidies Not Workable

Jacobsen told the subcommittee that he could see no merit in proposals to expand exploration by subsidies for wildcat wells, a system which he said could not be made workable because, for one thing, the actual cost of drilling a well was only part—and often a small part—of the total cost of developing a new discovery.

"If the Government were to go so far as to say 'we will pay the full cost of all wildcat wells' that would clearly be an utterly impossible position to take, because people would drill for subsidy instead of oil and there would be a waste of critical material," he declared.

The industry is carrying on exploration at a level fully equal to that of a

[*Continued on page 38*]

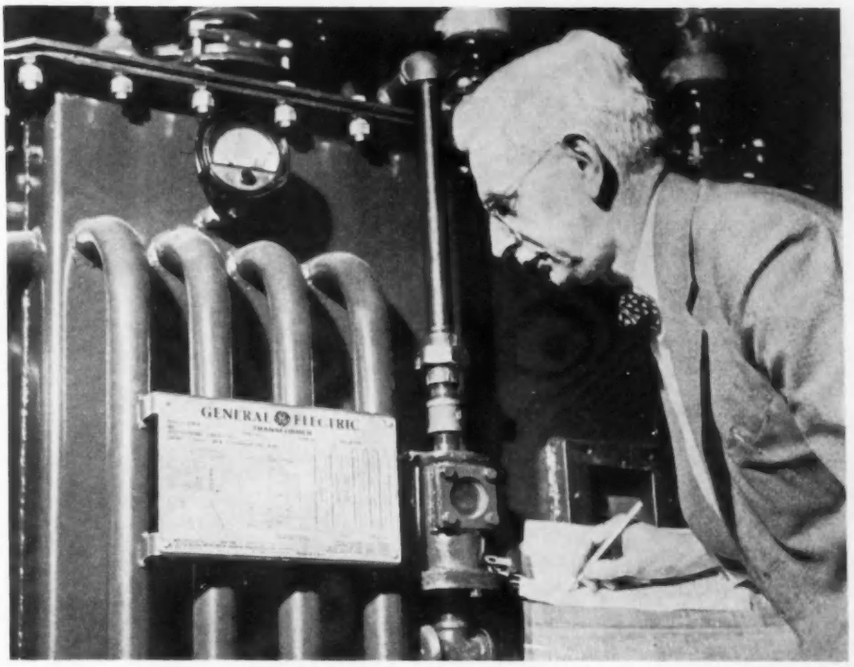
Transformer Maintenance

By M. H. BATES
Power Transformer Engineering Department, General Electric Company

THE attention given a transformer during its first few months in service is very important to assure long life and successful operation.

This may be a jolt to many operators who have felt that a transformer—a static piece of equipment—can be installed and forgotten. Actually, keeping a close check on the initial three months' operation will indicate whether the equipment has been installed properly, and if not, it will reveal any existing or incipient troubles.

Correct installation of the transformer is a matter of mutual interest to both the manufacturer and the purchaser, particularly when a complicated, high-voltage transformer is involved. The nameplate of most transformers cautions the purchaser to read carefully and follow the instructions accompanying the equipment before installing it. In spite of these carefully compiled instructions (perhaps they were not referred to), some strange things are done in installing transformer equipment. For example, one purchaser put a transformer into operation without filling it with oil, which had been shipped separately. Oddly enough, the equipment operated dry for some time without giving any trouble. True, some transformers are given, and take a lot of punishment, but if they are installed properly and thus given a fair chance, they will operate for years on end with the minimum of need for major overhauling. Sometimes good performance is handicapped by installing the transformers in a place where they will be operating under severe conditions. They should not be installed in poorly ventilated rooms, or where they will be exposed to dirt and fumes, or near high-temperature furnaces, or in boiler rooms, if they are to give the most efficient, trouble-free operation.



Check the transformer's nameplate and read the specific instructions to which it refers before installing the equipment. Gage that indicates level of oil at 25° C. is above nameplate on this transformer.

Preoperation Checks

Let us assume that a typical transformer is properly installed, and all connections have been correctly made. Right at that point—even before the transformer is energized—three things should be done:

1. The oil should be checked for proper level at 25° C. On small transformers, this means seeing that oil is up to the mark inside the tank. Larger transformers have gages which indicate the proper oil level at 25° C. If it is below this level, the oil may not circulate properly and the transformer may overheat, while oil much above this level may overflow when full load temperatures are attained, and cause excessive gas pressure in "sealed" transformers or excessive loss of gas in "gas-seal" transformers.

2. The ambient temperature should be checked. If the air surrounding the transformer exceeds 40° C. (with 24-hour average of 30° C.), full load should not be carried, and ASA Standards should be consulted before the transformer is loaded.

3. Dielectric strength of the oil should be checked, taking samples from the top and bottom of all the transformer's oil containers. Some specially designed transformers have as many as five separate compartments containing oil. It is important that a check of the oil in each compartment be made. The standard dielectric strength of oil when shipped is at least 25 kv when tested between 1-inch disks spaced 0.1 inch apart in standard oil-test receptacles.

Dielectric Tests

Remember that a dielectric test will be worthless if the oil is not sampled properly. Here are the fundamental precautions for correct sampling:

1. One-quart, clear-glass bottles are recommended for sampling. If a metal container is used, be sure it is free from rust or solder.

2. The bottle must be thoroughly clean and dry. It is usually a good idea

On small transformers, look inside the tank to make sure that the oil is at the proper level at 25° C.

Sample oil in a pint, clear-glass bottle that is clean and dry. Wiping the valve and running off some oil before taking the sample are good preliminary precautions.

to rinse it with clean, dry oil and allow it to drain for a few minutes.

3. Before drawing a sample from the bottom of the tank,* clean the valve and some oil to run off. This can be as much as a quart in the case of a large transformer. This will remove any condensate that may be in the valve.

4. Stopper or cap the container, and seal it with paraffin or wax immediately after drawing the sample. Do not use rubber or composition of rubber for gaskets or stoppers. If the sample is going to be sent away for testing, pack the bottle carefully to avoid breakage in shipment.

Dielectric strength tests of oil samples should be made each week for the first four weeks that a transformer is in operation. Thereafter, they should be made once every three months for water-cooled transformers, and once every six months to a year for other types, depending on the size and importance of the installation. Water-cooled transformers should be given a more frequent check because of the greater possibility of water leaks inherent in their construction.

Oil that tests 20 kv or less on a dielectric test should be passed through a filter press. In cases where filter press equipment is not needed frequently enough to justify this purchase, the oil can be filtered at the manufacturer's local service shop; or special arrangements can sometimes be made to obtain the equipment to do the job from the local utility company or the manufacturer of transformer equipment. In the filter press process, the contaminated oil is forced through several layers of special filter paper which absorbs the moisture and catches any sediment. Proper filtering of oil in an efficient press will raise its dielectric strength to values bewteen 25 kv and 30 kv. Immediately before using, the filter paper must be thoroughly dried according to the manufacturer's instructions.

For the first three months a transformer is in operation, a frequent check should be made of the oil level (or for evidence of loss of oil if no gage is provided) the ambient temperature, and the oil temperature. Any deviation from normal in these conditions probably indicates some trouble that can be easily rectified.

Transformers that are equipped with a winding temperature indicator should be checked at least twice daily to be sure that "hot-spot" temperatures are kept within safe limits. On an ordinary transformer, the maximum coil temperature should not exceed 90° C. If it does, an investigation should be made if the condition exists for more than the permissible overload period. The same thing holds true of the top oil temperature, which should not exceed 85° C. for more than a permissible period, as set forth in ASA Guide for Operation of Transformers, C-57.3.

Condensation

In transformers which are not sealed, thus permitting breathing of the air above the oil level, moisture may collect on the underside of the cover. There are three common causes of this condition: (1) leaky gaskets; (2) cracked or damaged porcelain bushings; (3) restricted breathing. In the first case, a new gasket is required; in the second, the bushing will have to be repaired or replaced; in the third, the breathers must be freed of dirt or other obstructions.

Transformers of this type should have the manhole or main cover removed for inspection after a short initial period of operation and periodically thereafter. If moisture, corrosion, or deposits of any type are found, the causes should be determined and corrected at once.

Removing Moisture

Moisture can be removed in either of two ways with the windings and core immersed in oil. One is by short-circuit drying of the windings; the other is by the so-called normal operation method

* Samples from askerel-filled transformers should be taken from the top through the small valve or plug provided for the purpose.

of drying. The short-circuit method is recommended.

Complete details on methods of drying are contained in the manufacturer's instruction books and should be followed closely. Briefly, the short-circuit method consists of heating the windings and oil by short-circuiting one winding and applying a suitable voltage to the other. Water vapor given off by the hot oil is carried away by ventilation and filtration.

The normal operation method is only applicable to transformers that normally permit breathing of air, and is accomplished mainly by forced or natural ventilation, and partially by filtration, while the transformer is in operation. Although this method can be used without shutting down the transformer, it should be used only in dry weather and if it is not feasible to remove the transformer from service for applying the short-circuit method.

A method of drying with the windings and core not immersed in oil and, preferably, enclosed in a temporary housing is the forced-air method. It consists of forcing clean, dry air at a temperature of 85° C. into the coils and insulation at the bottom of the transformer, allowing the air to escape at the top. This method is preferable for rectangular shell-type units because of their mass of solid insulation. Large quantities of air are required for a thorough drying job. The oil is dried separately by a filter press.

Oven drying is another method that can be used if necessary. This method entails removing the core and coil assembly from the tank and drying it in an oven, as the name implies. Still another method is the natural-draft method, in which heated air is allowed to circulate through the transformer by natural draft. Source of the heat may be resistance grids or a steam coil. There is a potential fire hazard in all types of hot-air drying if oil drips on the heat source or if the temperatures are not carefully controlled.

Usually, it is the safest practice to obtain recommendations regarding the drying of a large transformer from the nearest office of the manufacturer. Requests for this information should mention the serial number of the transformer with the voltages and kva available for drying, and also indicate whether any step-up or step-down transformers are available.

Chemical Tests of Oil

Color of the oil may indicate an abnormal condition. New transformer oil has very little color when viewed through a clear bottle approximately 1½ inches in diameter. After 10 or 15 years in a normally operated transformer, oil should be no darker in color than lager beer. Oil that is approaching the stage where sludging may result will be slightly reddish in color. The darker it becomes, the worse its condition. Sludging in transformers built during the last 20 years is rare. This is because of better over-all design of modern transformers.

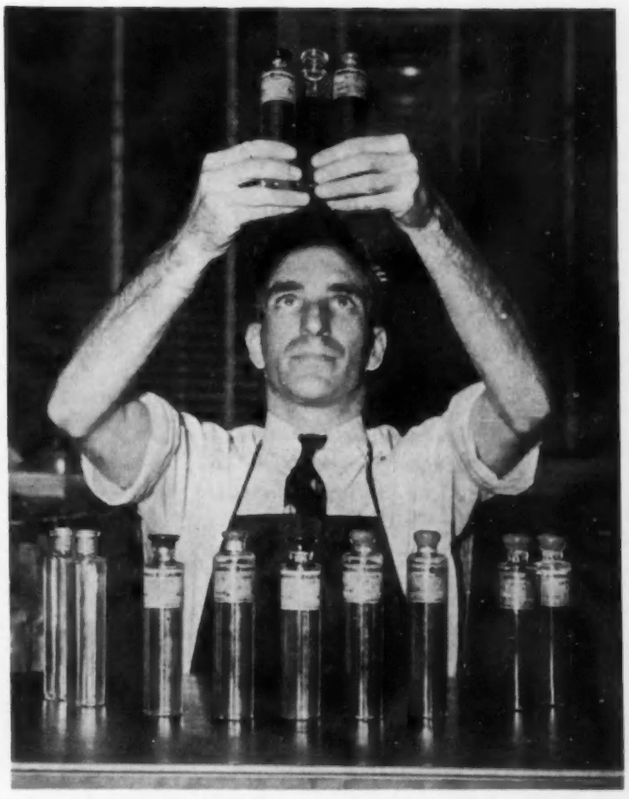
Oil that is badly discolored or sludged should be subjected to a chemical test. Most transformer manufacturers will make this test for a nominal fee ($2 is the fee charged by one company), furnish a report on the condition of the oil, and make recommendations regarding any servicing required. Ordinarily, the oil is given the following tests:

1. Specific gravity.
2. Viscosity.
3. Dielectric strength.
4. Neutralization (acidity).
5. Color (according to National Petroleum Association Standards).

Cooling Water Temperature

On water-cooled transformers, the incoming and outgoing water temperatures should be checked weekly during the initial installation period and every three months thereafter. Cooling water going into the transformer should not

Portable set for dielectric testing. Oil that tests 20 kv or less should be put through a filter press.



Color is a good indication of the condition of oil. Here sample is being checked against laboratory standards. New oil is almost water white; changes to color of lager beer after 10 to 15 years' normal service.

In replacing the cover use drift-pins to guide it to the proper position for bolting so that further movement that might endanger the gasket will not be necessary.

have a temperature of more than 25° C., and the temperature of the outgoing water should not be more than 10 degrees higher. If there is a rise in temperature of more than 10 degrees, the amount of water supplied may be insufficient. If this rise is less than 10 degrees at the specified rate of flow, there is a possibility of scale forming within or of oil sludge deposit on the outside of the coil. Thermometers installed permanently on the ingoing and outgoing water connections will facilitate these temperature checks. If the transformer has multiple cooling coils, the flow of water through each section should be adjusted so that the temperature rise in each one is the same.

Cleaning Cooling Coils

Scale and sediment can be removed from a cooling coil without removing the coil from the tank. First, disconnect both inlet and outlet pipes from the water system and temporarily pipe the coils to a point several feet away from the transformer. Next, blow or siphon all water from the coil, and pump it full of a solution of equal parts of hydrochloric acid and water. Leave one end of the coil partially open to prevent abnormal pressure which may otherwise result from the chemical action. Let the solution stand in the coil for an hour and then flush it out with clean water. Repeat the operation if all the scale is not removed the first time.

An oil deposit may form on the outside surface of the cooling coils in a water-cooled transformer after it has been in service for many years, especially if operating temperatures have been high. Obviously, this decreases the efficiency of the coil and results in higher oil temperatures. To remove oil deposits, the coil should be removed from the tank and scraped with a small, flexible chain.

Spare Transformers

Time and expense will be saved if spare transformers are kept in readiness for instant use. It must be remembered, however, that the spare transformer requires maintenance just the same as the transformer in operation. Once every six months, the oil level and its dielectric strength should be checked. Tight gaskets and breathing through a dehydrating breather, properly maintained, will help maintain the oil dielectric. On conservator-type transformers, oil should be kept in the conservator at all times. Watch the oil gages of such transformers when subzero temperatures exist. Checking these items regularly is the only way to be sure that the spare transformer will be ready for use when it is needed.

Drawing oil into containers like these lessens the possibility of getting a true sample. Rubber or comopsitions of rubber should never be used for gaskets or stoppers. Proper containers for samples are available from the manufacturer of the transformer.

Prediction of the Shrinkage of Crude Oils

By D. L. KATZ, University of Michigan

CRUDE oils in a natural reservoir under pressure contain dissolved natural gases which vaporize as the pressure is released on the oil. Vaporization causes a shrinkage in the volume of the remaining oil. This paper presents methods of predicting the shrinkage from measurements made on a well of gas gravity, oil gravity, gas-oil ratio, reservoir temperature, and reservoir pressure. These data, along with the correlations developed from shrinkage measurements on 117 crude oils, permit calculations of shrinkage with an accuracy approaching that of experimental determinations. Approximate methods of predicting shrinkage are presented when limited field data are available. Shrinkage predictions will assist in converting reservoir petroleum reserves into stock-tank quantities.

This paper, which represents the final report of the Special Subcommittee on Fundamentals of Sampling, Transporting and Analyzing Subsurface Samples of Crude Oil of the Topical Committee on Production Technology, was presented to the Division of Production of the American Petroleum Institute on November 10, 1942, Chicago, Ill. The statements and opinions expressed are those of the author, and should not be construed as an official action or opinion of the Institute.

CRUDE oil in a natural reservoir under pressure contains dissolved gases; and, as the crude oil travels from the reservoir to the lease storage tank, the volume of the oil decreases. One barrel of oil in the lease tank may require 1.2 barrels of reservoir fluid to be produced from the reservoir. The reduction in volume of the reservoir fluid caused by reduction in temperature and by the liberation of the natural gas as the pressure is decreased has been described customarily as the shrinkage of the oil.[1,4] Laboratory measurements are made of this gas liberation or shrinkage process to give the actual shrinkage values to be used for specific reservoirs. However, in many cases a particular engineer may not have available the shrinkage data for a given reservoir, and it may be necessary for him to estimate this shrinkage. Any computation of oil and gas reserves must include a shrinkage factor to convert reservoir oil to stock-tank oil.

Recent information on the methods of computing the density of liquids containing dissolved gases makes possible more accurate calculation of phase behavior under pressure for crude-oil-natural-gas systems.[2] This report covers several methods for predicting the shrinkage of a reservoir crude oil when such field data as reservoir pressure, reservoir temperature, solubility of the gas in the oil, lease-tank crude-oil gravity, and gravity of the gas (air equals 1) are given for the reservoir under consideration. When all of these items are known, the method is straightforward and reliable; whereas if only solubility, crude-oil gravity, reservoir pressure, and reservoir temperature are known, the method becomes less reliable. For cases in which only crude-oil gravity, reservoir temperature, and reservoir pressure are available, even more approximate methods are presented. A rough method for prediction of the solubility of gas in the crude oil from saturation pressure and crude-oil gravity follows the shrinkage calculations.

The shrinkage calculations do not depend upon the separation process, i.e., flash or differential vaporization of the gas;[1] because the properties of the resulting gas and liquid, as well as the quantity of gas liberated, compensate for any changes in the shrinkage value.

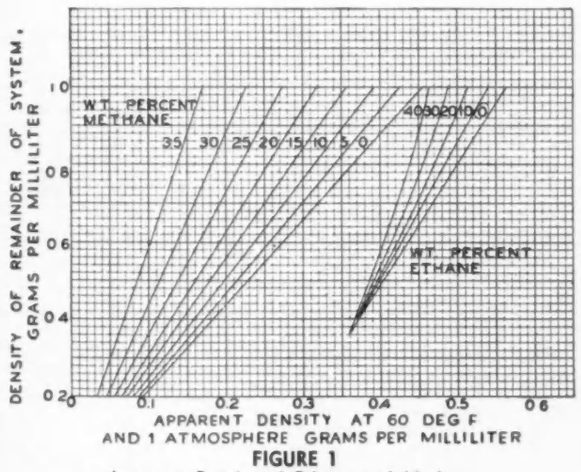


FIGURE 1
Apparent Density of Ethane and Methane.

Density of Liquids Saturated with Natural Gas

A method of computing the density of crude oil saturated with natural gas has been presented recently.[2] The method consists of computing the density of the liquid at 60° F. and 1 atmosphere of pressure by the use of additive volumes and correcting the density from 60° F. and 1 atmosphere: first, to the pressure desired, and then to the desired temperature. The densities of all constituents heavier than ethane are taken as the normal density in grams per milliliter or pounds per cubic foot of the pure constituent at 60° F. and its vapor pressure. For methane and ethane, it was necessary to devise an apparent density chart which gives the density of methane and of ethane as a function of the concentration (in weight percent) in the liquid, and of the density of the constituents other than methane or ethane. In most cases the method will compute the density of the crude oil saturated with natural gas to about ± 2 percent.

The calculations of the density of a crude oil saturated with natural gas requires the analysis of the gas which is liberated when the crude oil is reduced in pressure, such as to atmospheric, along with the density of the remaining crude oil at the lower pressure. The quantity of gas liberated is added to the final crude oil, and the total volume of the crude oil saturated with this gas is computed at the satura-

tion temperature and pressure. This volume minus that of the residual crude oil gives the shrinkage caused by vaporization.

Table 1 is an example calculation of the shrinkage for the Crescent crude, and is based upon the data from Lindsly[4] as presented by Standing and Katz.[2] The only unusual feature of the calculation is that the density of the propane and heavier material of the gas plus crude oil must be computed in order to find the density of the ethane to be used from Figure 1. Likewise, the density of the ethane and heavier material must be computed to find the apparent density of methane for the particular calculation. Figure 1 gives the apparent densities of methane and ethane as a function of weight percent in the liquid, and of the density at 60° F. and 1 atmosphere for the remainder of the material present. Figure 2 presents the correction to be made for the density at pressure as compared to the density at 1 atmosphere, both at 60° F. Figure 3 is the chart which corrects the density of the material under pressure from 60° F. to the saturation temperature. The density at 60° F. may not fall on one of the lines given, but may be interpolated between the relatively parallel lines. Both the temperature- and pressure-correction charts are similar to those presented with the method of computing the density of crude oil,[2] although the units have been converted from grams per milliliter into pounds per cubic foot because of the convenience in shrinkage calculations.

The foregoing procedure for computing the shrinkage of an oil is a convenient one, and is the most reliable method known, if the analysis of the gas vaporized, the resultant gravity of the oil, and the saturation temperature and pressure are available. In most cases, if the analysis of the gas is available, the actual shrinkage measurement may have been made. The need for shrinkage predictions is for cases wherein the analysis of the gas is not known, although the quantity of gas and its gravity or molecular weight may be available.

TABLE 1
Example Calculation of Shrinkage Factor for Crescent Crude

Given:

Gas liberated, cu ft per bbl of residual oil	814
Crude gravity (from Bureau of Mines) deg API	41.7
Saturation temperature, °F.	149
Saturation pressure, psi (absolute)	2,575

GAS ANALYSIS

Component	Volume Percent
Methane	75.33
Ethane	10.09
Propane	6.96
Butanes	5.58
Pentanes	1.56
Hexanes plus	0.48

CALCULATION OF SHRINKAGE

Component	Cubic Feet	Molecular Weight	Pounds	Liquid (Pounds Per Cubic Foot, at 60° F. and 14.7 PSI)	Liquid (Cubic Feet)
Methane	612	16	25.8	20.1	1.283
Ethane	82.0	30	6.5	30.9	0.210
Propane	56.6	44	6.6	31.8	0.208
Butanes	45.4	58	6.9	36.1	0.191
Pentanes	12.7	72	2.4	39.2	0.061
Hexanes plus	3.9	86	0.8	41.5	0.019
Crude oil	5.61	..	286.0	51.0	5.610
Total			335.0		7.582
Propane plus			302.7		6.089
Ethane plus			309.2		6.329

Density of propane plus $= \frac{302.7}{6.089} = 49.8$ lb per cu ft $= 0.799$ grams per milliliter.

Weight percent ethane $= \frac{6.5}{309.2} = 2.1$ lb per cu ft.

Weight percent methane $= \frac{25.8}{335.0} = 7.7$ lb per cu ft.

From Figure 1: Apparent density of ethane $= 0.496$ grams per milliliter $= 30.9$ lb per cu ft.

Density of ethane plus $= \frac{309.2}{6.300} = 49.1$ lb per cu ft $= 0.788$.

From Figure 1: Apparent density of methane $= 0.322$ grams per milliliter $= 20.1$ lb per cu ft.

Density of reservoir fluid at 60° F. and 1 atmosphere $= \frac{335.0}{7.582} = 44.2$ lb per cu ft.

Density of reservoir fluid at 60° F. and 2,575 lb, using correction from Figure 2, is $44.2 + 0.9 = 45.1$ lb per cu ft.

Density of reservoir fluid at 149° F. and 2,575 lb, using Figure 3, is 42.8 lb per cu ft.

Cubic feet of reservoir fluid per barrel of residual oil $= \frac{335}{42.8} = 7.82$ cu ft.

Volume of dissolved gas $= 7.82 - 5.61 = 2.21$ cu ft.

Shrinkage $= \frac{2.21}{5.61} = 39.4$ percent based on residual oil.

Shrinkage reported by Lindsly $= 40.7$ percent (reference 4).

Calculated formation-volume factor $= 1.394$.

Shrinkage based on reservoir oil $= \frac{221}{7.82} = 28.3$ percent.

Calculation: Apparent density of dissolved gas at 60° F. and 1 atmosphere:

7.583 cu ft total at 60° F. and 1 atmosphere	335.0 lb total
5.61 cu ft residual oil at 1 atmosphere	286.0 lb crude oil
1.97 cu ft dissolved gas at 1 atmosphere	49.0 lb dissolved gas.

Apparent density of dissolved gas $= \frac{49.0}{1.94} = 24.9$ lb per cu ft.

Apparent Density of Natural Gases

The shrinkage calculation made from the analysis of the gas and the gravity of the resulting crude oil could have been made by using an apparent density for the entire gas mixture which would have been obtained by averaging the density of the constituents in the natural gas. Inasmuch as there is a definite relation between the butane-free gasoline content and the ethane, propane, and butane concentration in natural gases,[3] it would seem that there would be a relationship between the molecular weight or gravity of the gas and this apparent density of the gas when computing the shrinkage of the crude oil saturated with the gas. If this relationship were found, it would be possible to compute the shrinkage from the quantity of gas dissolved in the oil, the gravity of the gas, the gravity of the oil, and the saturation temperature and pressure.

Two types of data were contributed by subcommittee members which would be useful for a correlation of gas gravities and apparent densities. Some were shrinkage experiments which analyzed the gases evolved. Others were simply gas analyses and crude-oil gravities for wells pro-

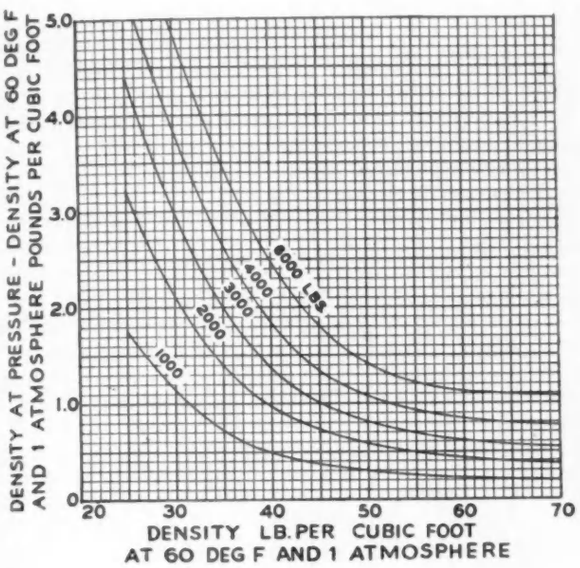


FIGURE 2
Density Change of Crude Oils With Pressure.

ducing saturated crude oils at known gas/oil ratios. The apparent densities of the natural gases, when dissolved in the saturated crude oil for the 22 samples, were computed. The calculation is very similar to that presented in Table 1. The pounds of the gaseous constituents added to the residual crude oil, divided by the cubic feet of the gas when in the liquid state at 60° F. and 1 atmosphere pressure, is the apparent density of the gas dissolved in the crude oil.

Figure 4 is a correlation of the apparent densities of the natural gases as a function of the gas gravity and of the crude-oil gravity resulting from the vaporization of a subsurface sample of crude oil. The gas gravity is in reality the molecular weight of the gas divided by 29.0, the molecular weight of air. The differences in the apparent density for the same gas gravity are not represented perfectly by the gravity of the crude oil, but it is the best factor which could be found. Table 2 gives the comparison of the apparent density of the 22 natural gases as calculated from the analysis and from the gas gravity of Figure 4. The percentage error shown on Table 2 should not necessarily be zero as an average, because some correction was made to the curves of Figure 4 when this figure was used to compute the shrinkage of the large number of crude oils for which gas gravity and shrinkage were given.

It should be noted that the apparent density of a gas is dependent upon the solubility of the gas in addition to the gas and crude-oil gravities. As more data become available, this variable should be included.

TABLE 2
Comparison of Apparent Densities of Natural Gas as Calculated from Analysis and from Figure 4

GAS No.	Gas Gravity (Air=1)	Crude Oil Gravity (Deg. API)	Calculated Apparent Density (Pounds Per Cubic Foot)	Apparent Density Read from Fig. 4 (Pounds Per Cubic Foot)	Error (Percent)
1	0.829	30.2	28.4	26.8	—5.6
2	0.653	31.8	23.6	22.3	—5.5
3	0.773	29.9	25.0	25.7	+2.8
4	0.685	36.3	23.5	22.5	—4.2
5	0.695	34.6	24.0	23.0	—4.1
6	0.810	36.3	25.2	25.5	+1.2
7	1.106	39.6	29.2	30.0	+2.7
8	0.767	39.0	23.6	23.9	+1.3
9	0.620	34.8	23.2	21.0	—9.5
10	0.665	36.0	22.6	22.2	—1.8
11	0.660	37.4	21.8	21.7	—0.5
12	0.665	38.4	21.8	21.6	—0.9
13	0.688	38.4	22.6	22.2	—1.8
14	0.705	42.0	22.3	22.0	—1.3
15	0.610	40.8	21.8	19.7	—9.6
16	0.867	41.3	27.0	25.5	—5.6
17	0.865	40.9	25.7	25.5	—0.8
18	0.963	38.7	29.0	28.0	—3.5
19	0.960	41.6	29.4	27.2	—7.5
20	1.040	41.2	28.2	28.5	+1.1
21	0.985	43.2	29.2	27.4	—6.2
22	1.018	42.2	28.2	28.1	—0.4

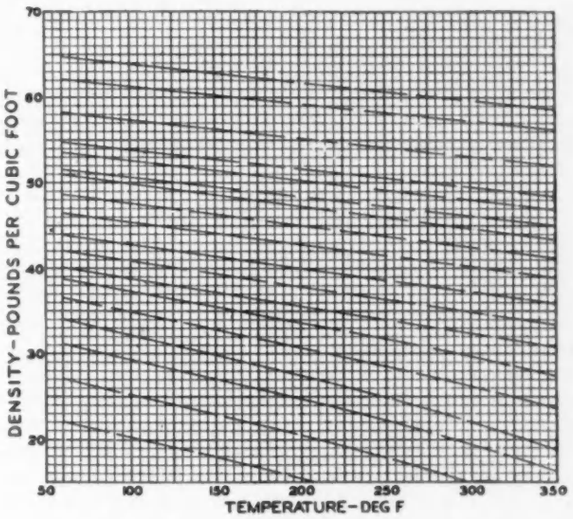


FIGURE 3
Density Change of Crude Oils With Temperature.

Shrinkage Calculations from Gas Gravity, Solubility, Pressure and Temperature of the Crude Oil, and Crude Gravity

The next simplest method of calculating shrinkage over the use of the gas analysis is that of using the gas gravity, quantity of gas liberated or solubility, saturation temperature, saturation pressure, and residual crude-oil gravity. Members of the subcommittee and other cooperating laboratories submitted the results of 53 experimental shrinkage measurements along with these data. Calculations were made of the percentage shrinkage at the saturation temperature with the liberation of the gas listed and with the resulting crude oil as measured by its API gravity. Table 3 is an example calculation of the shrinkage of a saturated crude oil when the gas gravity is given. Table 4 gives the results of the calculations for the 53 cases. Sixteen of the crude oils had an average positive error of 4.5 percent, whereas 37 of the crudes had an average error of —3.6 percent, with an algebraic average of —1.2 percent. These percentages are of the experimental shrinkage value; and, if considered in the light of the error which the calculations would make on an

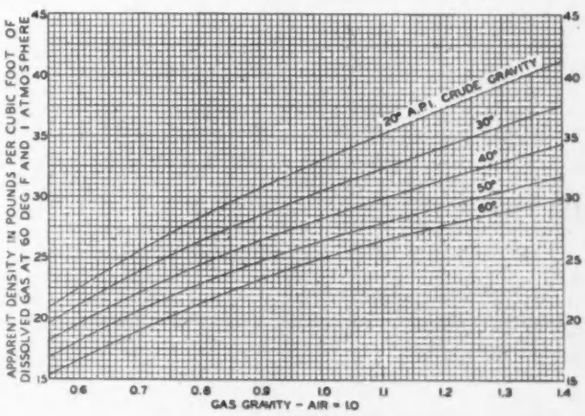


FIGURE 4
Apparent Density of Natural Gases.

estimation of the quantity of stock-tank oil as compared to the reservoir oil, these errors are reduced materially. For example, the maximum error on crude sample No. 28 is + 15.2 percent, based upon the experimental shrinkage value; whereas this error, if computed upon the basis of the quantity of crude oil in a reservoir as compared to the quantity in the lease storage tank, becomes an error of 2.4 percent. The general accuracy of this method in the majority of cases approaches that of the experimental measurement. Some of the larger errors may be due to the presence of non-hydrocarbon constituents in the natural gas, such as carbon dioxide or nitrogen. The method is based upon hydrocarbon gases, and may not be expected to be so accurate for non-hydrocarbon gases.

Approximation of Shrinkage

Although the methods described hereinbefore are the more reliable for estimating the shrinkage of crude oils, sufficient data may not be available to use these methods. Approximations of less reliability, but requiring a smaller amount of data, will now be presented.

An approximation of the shrinkage may be made if the crude-oil gravity, the solubility of the gas, and the saturation temperature and pressure are known in the absence of gas gravity. A very approximate relationship has been devised which predicts the gas gravity of the liberated gas as a function of the solubility of the gas and of the crude-oil gravity (Figure 7). Sixty-four of the experimental shrinkage values reported by the subcommittee members and cooperating laboratories did not include the gas gravity or gas analysis. The gas gravities were predicted from Figure 7, and then the shrinkage computations were made in the same manner as if the gas gravity had been given as previously described. Table 5 presents the results of such calculations on the 64 crude samples. Thirty-eight of the crude samples have an average positive error of 11 percent, whereas 26 of the samples have an average negative error of 7 percent. Calculations for all 117 of the shrinkage values reported, but not using the gas gravity when it was reported, give an average of about 8 percent for both positive and negative errors, an algebraic average error of + 0.64 percent—showing that Figure 7, for predicting gas gravity, has been constructed properly even through rather large errors in individual gas gravities do occur.

The simplest relation between shrinkage and other variables is that of shrinkage and solubility of the gas in the oil. Inasmuch as the correction of the residual oil at the vaporization temperature to 60° F. is computed easily, this factor is removed from the experimental shrinkage, and offsets in part the effect of the differences in temperature. The shrinkage values reported by the subcommittee members and cooperating laboratories of 117 crude samples were corrected in Figure 5 for the saturation or vaporization temperature, and then plotted against the solubility in cubic feet of gas per barrel of residual oil in Figure 6. Considerable scattering of the points occurs, as would be expected for such a simple relationship, inasmuch as the crude oils came from most of the major oil-producing areas in the United States and had variations in temperature of vaporization, crude-oil gravity, and saturation pressure over a wide range. The relationship has an approximate error on the average of ± 15 percent of the shrinkage, but may be off 25 percent or more on occasion. The shrinkage obtained in Figure 6 is enlarged by the temperature correction in Figure 5 when the shrinkage is computed by this method.

Prediction of Solubility

As data on the solubility of gases in the crude oil at various saturation temperatures and pressures and for various residual crude-oil gravities were available, a method of prediction of the solubility of gases in crude oil was considered. It is realized that the variation in the source of the sample will have considerable to do with the solubility of the gas for samples of the same crude-oil gravity and saturation pressure and, therefore, any relationship of these variables would be only approximate. Figure 8 has been prepared, which gives an approximate relationship between the solubility of gas in the crude oil as a function of saturation pressure of the crude oil and the residual crude-oil gravity. A more accurate relationship would require the knowledge of another variable such as gas gravity, but the chances of an engineer's having such additional data without having the solubility are relatively small and, hence, such a relationship would have dubious value. The average error of calculating the solubility from Figure 8 as compared with the experimental solubility is about 25 percent. Figure 8 should be used only in cases in which other data are not available. This solubility prediction makes possible another method of predicting shrinkage from crude-oil gravity, saturation pressure, and saturation temperature.

TABLE 3

Example Calculation of Shrinkage When Gas Gravity, Solubility, Crude Gravity, Reservoir Pressure, and Reservoir Temperature Are Given

DATA GIVEN FOR CRUDE SAMPLE No. 2, TABLE 4

Saturation or reservoir temperature, °F.	108
Saturation or reservoir pressure, psi (absolute)	1,853
Gas gravity (air = 1.0)	1.031
Crude gravity, °API	32.8
Solubility, cubic feet per barrel of residual oil	666

SHRINKAGE CALCULATION

Apparent density of dissolved gas from Figure 4 = 30.3 lb per cu ft.

$$\frac{666 \text{ cu ft (29.0 molecular weight of air) (1.031 gas gravity)}}{379 \text{ cu ft per mol}} = 52.5 \text{ lb of dissolved gas.}$$

$\frac{52.5}{30.3} = 1.73$ cu ft of dissolved gas

5.61 cu ft of residual crude oil

7.34 cu ft at 60° F. and 1 atmosphere

32.8° API = 301.5 lb per bbl

301.5 lb of crude
52.5 lb of gas
354.0 lb total.

Density at 60° F. and 1 atmosphere $= \frac{354.0}{7.34} = 48.3$ lb per cu ft at 60° F. and 1 atmosphere.

By Figure 2, 48.3 + 0.6 = 48.9 lb per cu ft at 60° F., 1,853 lb.
By Figure 3, 48.9 goes to 47.7 lb per cu ft at 108° F., 1,853 lb.

$\frac{354 \text{ lb}}{47.7} = 7.42$ cu ft per bbl of residual oil

5.61 cu ft crude oil

1.81 cu ft dissolved gas.

Calculated shrinkage = $\frac{1.81}{5.61} = 32.3$ percent based on residual oil.
Experimental shrinkage = 34.9 percent based on residual oil.
Error = — 7.4 percent.

Calculated formation-volume factor = 1.323
Experimental = 1.349
Error = — 1.9 percent.

TABLE 4
Comparison of Experimental and Calculated Shrinkages—Using Gas Gravity, Solubility, Pressure, Temperature, and Crude Gravity

Crude Sample No.	Saturation: Temperature (° F)	Saturation: Pressure (PSI, Absolute)	Crude Gravity (Deg. API)	Gas Gravity: Air=1.0	Gas Solubility (Cubic Feet Per Barrel of Oil)	Shrinkage (Percent of Residual Crude): Experimental	Shrinkage (Percent of Residual Crude): Calculated from Fig. 4	Error Based on Experimental (Percent)
1	209	3,285	41.8	0.925	1,100	70.6	63.0	—10.7
2	108	1,853	32.8	1.031	666	34.9	32.3	— 7.4
3	120	735	39.5	0.941	125	9.0	8.9	— 1.1
4	196	1,765	30.2	0.861	263	19.2	18.0	— 6.2
5	115	1,550	33.9	0.961	359	19.5	19.0	— 2.6
6	115	2,000	33.6	0.867	567	28.2	27.2	— 3.5
7	212	2,490	31.8	0.869	663	41.9	38.9	— 7.2
8	115	3,020	33.4	0.874	737	35.2	34.4	— 2.3
9	205	3,650	29.9	0.798	753	41.9	39.5	— 5.7
10	211	2,920	36.3	0.82	767	44.7	43.9	— 1.8
11	213	3,265	34.6	0.82	820	46.0	46.2	+ 0.4
12	250	3,155	43.0	0.777	858	50.9	51.2	+ 0.6
13	211	3,215	36.3	0.817	880	48.6	48.5	— 0.2
14	140	1,880	39.6	1.12	995	56.4	56.9	+ 1.0
15	58	2,900	39.0	0.792	1,020	44.0	42.3	— 3.9
16	212	3,555	34.8	0.839	1,031	58.0	55.1	— 5.0
17	212	3,570	36.0	0.831	1,048	59.0	56.8	— 3.7
18	60	3,400	37.4	0.783	1,172	52.3	46.9	—10.7
19	212	3,950	38.4	0.788	1,180	66.1	61.9	— 6.4
20	175	1,547	41.7	0.96	501	34.4	31.0	— 9.9
21	171	2,320	55.9	0.82	1,130	67.4	67.2	— 0.3
22	130	1,406	41.1	1.08	712	42.0	41.2	— 1.9
23	147	1,540	42.6	1.00	575	34.3	33.8	— 1.4
24	177	3,020	33.4	0.65	534	27.4	26.9	— 1.8
25	95	1,195	37.3	0.97	456	23.8	22.4	— 6.0
26	95	1,504	38.0	0.855	685	33.3	32.6	— 2.1
27	85	499	32	0.993	214	9.8	10.8	+10.2
28	84	825	35	1.386	390	19	21.9	+15.2
29	85	689	33	0.734	290	15	13.0	—13.4
30	115	883	37.7	1.250	308	19.6	18.7	— 4.6
31	115	803	34.6	1.212	263	17.0	15.8	— 7.0
32	128	1,842	38.5	1.073	593	33.3	32.8	— 1.5
33	128	1,595	38.2	1.101	455	26.1	26.1	0
34	148	513	24.3	0.775	76.6	7	6.9	— 1.4
35	180	1,023	25.8	0.828	167.3	12.5	11.8	— 5.6
36	151	717	31.8	0.842	142.6	9.9	10.2	+ 3.0
37	199	2,595	32.5	0.740	488	28.2	27.8	— 1.7
38	149	2,212	34.8	0.742	477	23.8	24.0	+ 0.8
39	198	2,498	35.6	0.806	667	43.0	42.0	— 2.3
40	190	2,135	39.0	0.877	628	38.5	41.0	+ 6.5
41	255	2,345	39.0	0.877	628	44.8	46.2	+ 3.1
42	149	2,730	48.3	0.783	1,313	74.0	67.8	— 8.4
43	180	1,783	63.7	0.830	1,042	72.3	72.6	+ 0.4
44	168	2,072	26.5	0.947	415	24.5	22.4	— 8.6
45	187	3,338	38.5	0.683	566	28.5	30.4	+ 6.8
46	120	1,314	21.9	0.602	145	7.65	7.2	— 5.9
47	177	3,419	37.0	0.799	880	44.9	45.2	+ 0.6
48	157	2,364	25.9	0.632	353	17.1	17.8	+ 4.1
49	192	3,519	37.0	0.695	844	43.7	46.8	+ 7.1
50	205	3,341	37.3	1.043	892	53.0	52.7	— 0.6
51	158	2,179	44.7	0.827	738	42.5	41.0	— 3.7
52	180	1,899	45.3	0.930	719	45.2	44.0	— 2.7
53	133	1,772	21.8	0.575	210	9.9	10.0	+ 1.0
Column No. (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Average+ = 4.5 percent
Average— = 3.6 percent
Algebraic average = —1.16 percent

Five methods of predicting the shrinkage of reservoir crude oil when the dissolved gas is liberated have been described for cases wherein experimental shrinkages were not available. These methods are of decreasing accuracy for decreasing amounts of information available to predict the shrinkage. The methods are: 1, computation of the shrinkage when the gas analysis of the liberated gas, quantity of liberated gas or solubility, saturation pressure, saturation temperature, and residual crude-oil gravity are known; 2, calculation of shrinkage when the gravity of the liberated gas, quantity of liberated gas or solubility, residual crude-oil gravity, saturation temperature, and saturation pressure are given; 3, calculation of shrinkage when the quantity of gas liberated or solubility, residual crude-oil gravity, saturation pressure, and saturation temperature are known; 4, calculation of the shrinkage when the solubility of the gas and saturation or vaporization temperature are known; and, 5, calculation of shrinkage when only crude-oil gravity, saturation pressure, and saturation temperature are known.

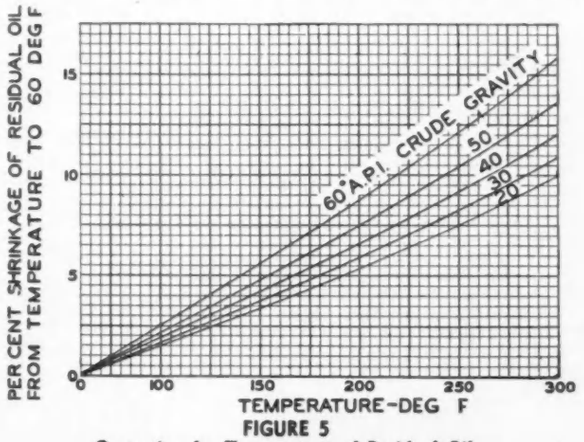


FIGURE 5
Correction for Temperature of Residual Oil.

Nomenclature

The term "shrinkage" used in this report generally refers to shrinkage, percentage based on residual or stock-tank oil.[1] Other methods of expressing shrinkage are in use,[5] and the

TABLE 5
Comparison of Experimental and Calculated Shrinkages—Using Crude Gravity, Solubility, Pressure, and Temperature (Gas Gravity Not Given)

Crude Sample No.	Saturation: Temperature (° F)	Saturation: Pressure (PSI, Absolute)	Crude Gravity (° API)	Gas Solubility (Cubic Feet Per Barrel of Oil)	Shrinkage (Percent Residual Crude): Experimental	Shrinkage (Percent Residual Crude): Calculated from Fig. 7 and 4	Error Based on Experimental (Percent)
1	139	2,278	40.1	1,103	62.0	55.6	—10.3
2	130	1,460	40.8	789	46.3	42.0	— 9.3
3	149	1,373	42.4	539	29.7	31.8	+ 7.1
4	144	1,550	42.4	677	39.5	39.2	— 0.7
5	150	2,920	41.5	1,066	52.2	55.3	+ 5.9
6	122	1,120	41.0	475	25.2	26.9	+ 6.7
7	106	161	40.0	21	2.2	3.2	+45.5
8	98	1,092	40.4	458	25.6	24.0	— 6.2
9	98	660	39.5	284	15.9	16.3	+ 2.5
10	75	146	36.2	9.3	0.83	1.0	+20.5
11	117	1,167	44.9	502	28.5	29.4	+ 3.2
12	97.5	1,252	33.0	522	24.0	23.9	— 0.4
13	90	1,438	33.2	454	18.9	20.8	+10.0
14	90	1,281	35.5	436	19.1	20.2	+ 5.8
15	87	1,339	41.8	677	31.8	33.8	+ 6.3
16	180	3,380	36.8	614	28.8	33.9	+17.7
17	118	1,050	42.5	355	18.4	21.0	+14.1
18	125	1,160	42.2	428	25.9	24.9	— 3.9
19	166	1,440	43.7	665	56.6	41.0	—27.5
20	132	1,095	41.1	470	32.9	27.6	—16.1
21	124	1,270	42.3	518	30.7	29.2	— 4.9
22	110	1,135	38.7	283	14.6	16.0	+10.9
23	118	960	41.2	235	15.6	14.6	— 6.4
24	100	1,385	35.4	276	13.7	13.8	+ 0.7
25	94	695	37.7	144	9.3	8.6	— 7.5
26	135	1,225	39.7	385	22.1	22.2	+ 0.4
27	128	1,160	42.2	450	25.8	26.8	+ 3.9
28	194	2,120	49.4	705	46.2	48.2	+ 4.3
29	199	2,785	33.0	612	38.4	34.1	—11.2
30	207	4,100	49.6	1,155	63.4	61.8	— 2.9
31	172	2,535	40.0	656	37.8	37.8	+ 0.0
32	170	2,125	35.0	470	25.6	26.5	+ 3.5
33	147	1,690	42.0	618	37.0	35.7	— 3.5
34	110	1,565	41.0	570	25.7	31.8	+23.7
35	170	1,665	43.0	554	33.7	34.9	+ 3.6
36	130	1,477	40.8	763	29.7	40.7	+39.4
37	128	1,990	41.3	640	25.7	35.5	+38.2
38	79	546	39.3	164	8.0	8.9	+11.2
39	114	2,034	37.7	543	24.8	27.7	+11.7
40	207	3,340	38.3	960	49.8	56.8	+14.1
41	144	518	21.9	71	6.4	5.9	— 7.8
42	198	2,197	38.3	549	31.4	33.6	+ 7.0
43	170	2,264	31.3	442	17.0	21.1	+24.1
44	168	2,560	29.8	459	22.2	21.2	— 4.5
45	157	1,194	26.6	503	19.7	16.0	—18.8
46	174	2,313	38.8	529	29.0	30.8	+ 6.2
47	97	1,371	35.0	468	21.2	22.0	+ 3.8
48	118	1,104	41.5	364	22.8	21.1	— 7.0
49	156	2,107	46.9	1,027	56.8	58.0	+ 3.5
50	156	1,776	26.6	247	14.6	13.8	— 5.5
51	158	2,789	31.2	451	22.0	24.0	+ 9.1
52	127	788	22.4	98	5.9	6.3	+ 6.8
53	185	2,264	36.7	526	27.8	30.8	+10.8
54	142	682	38.4	371	24.9	22.2	—10.8
55	90	1,312	34.0	399	19.6	18.8	— 4.1
56	126	1,230	23.2	161	8.3	8.1	— 2.4
57	180	2,756	41.1	1,010	57.7	56.2	— 2.7
58	161	2,202	37.8	538	31.0	30.2	— 2.6
59	94	264	34.4	150	8.9	8.1	—10.1
60	135	1,830	42.5	745	42.0	41.0	— 2.4
61	89	1,175	36.4	366	17.3	17.8	+ 2.9
62	91	1,326	33.4	380	16.5	17.4	+ 5.4
63	84	1,323	36.0	475	20.0	21.1	+ 5.5
64	112	1,684	33.0	621	25.1	29.1	+16.0
Column No. (1)	(2)	(3)	(4)	(5)	(7)	(8)	(9)

Average+ = 11.1 percent
Average— = 7.3 percent
Algebraic average = + 3.6 percent

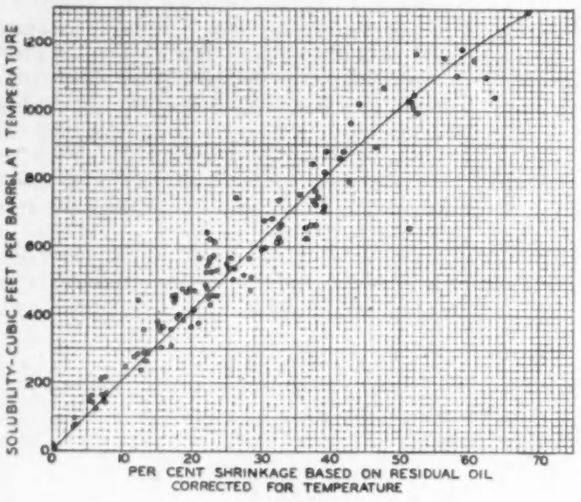


FIGURE 6
Shrinkage (Corrected for Temperature of Residual Oil) vs. Solubility.

definition of terms should be observed carefully. The formation volume factor is defined[5] as the volume under reservoir conditions of the oil and its dissolved gas from which is derived 1 volume of crude oil at surface conditions. The shrinkage may be expressed also as a percentage based on the reservoir oil. The difference between unity and this percentage based on reservoir oil has been called the "shrinkage factor."[6]

For example, if 1.35 barrels of reservoir oil containing dissolved gases are required to produce 1.00 barrel of stock-tank or residual crude oil at 60° F., the following ways may be used to represent this shrinkage:

Shrinkage, percentage based on residual oil = 35 percent.

Formation volume factor = 1.35.

Shrinkage, percentage based on reservoir oil[7]

$$\frac{0.35}{1.35} = 25.9 \text{ percent.}$$

Shrinkage factor[8] $= \frac{1}{1.35} = 0.741$ or $1.00 - 0.259 = 0.741$.

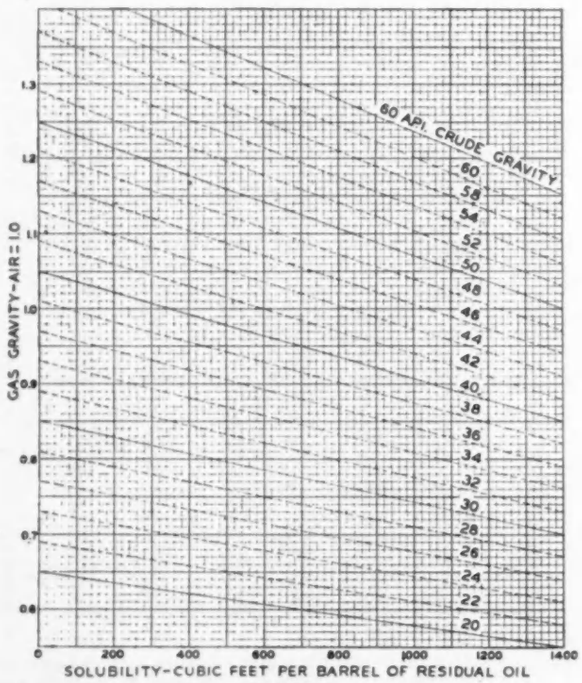


FIGURE 7
Prediction of Gas Gravity From Solubility and Crude-Oil Gravity.

The first of these methods was used throughout this report, but the values for the other definitions may be found by the simple calculation shown.

For crude oil containing small quantities of non-hydrocarbon gases, or none at all, the first of these methods has an accuracy approaching that of the experimental determination; whereas the fourth and fifth methods may have errors of 25 percent or more of the shrinkage value. In addition to the methods of predicting shrinkage, an approximate relationship for predicting the solubility of the gas in the oil from the saturation pressure and the crude-oil gravity of the residual oil has been presented.

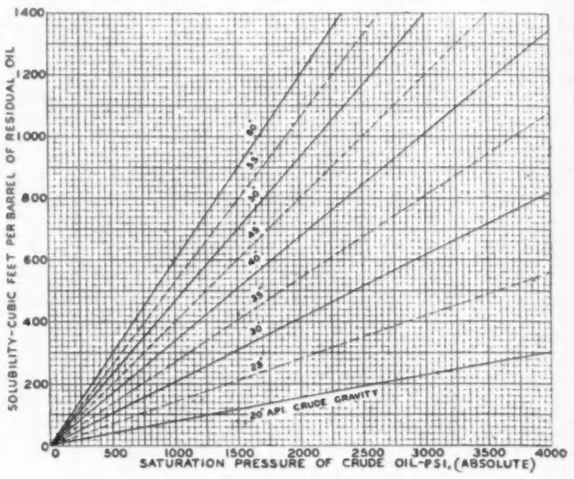


FIGURE 8
Prediction of Solubility From Saturation Pressure and Residual Crude-Oil Gravity.

Acknowledgment

The accumulation of solubility and shrinkage data and the planning of this problem were done by the subcommittee members and by cooperating laboratories, as follows:

Subcommittee members: W. B. Berwald, The Ohio Oil Company; J. B. Clark, Stanolind Oil & Gas Company; P. G. Exline, Gulf Research & Development Company; J. E. Gosline, Standard Oil Company of California; H. H. Kaveler, Phillips Petroleum Company; Carl Vicksburg, The Carter Oil Company; R. J. Schilthuis, Humble Oil & Refining Company; and D. L. Katz (chairman), University of Michigan. A. G. Loomis, Shell Development Company; James A. Lewis, Core Laboratories, Inc.; C. V. Millikan, Amerada Petroleum Corporation; and R. E. Heithecker, of the Bureau of Mines, contributed data for the project. The major portion of the calculations was made by John W. Delaplaine as a National Youth Administration assistant, and as graduate research work at the University of Michigan. The problem originally was suggested by H. H. Power of the University of Texas, who was chairman of the Topical Committee on Production Technology at the time.

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Ten wells being pumped by Kobe Hydraulic Control Plant with pumps set at 3,500 feet and producing approximately 20 barrels per day per well allowable.

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KOBE HYDRAULIC PUMPING SYSTEM

Cleaning Problems of the Oil Fields

By DR. R. W. MITCHELL
Technical Director, Magnus Chemical Company,
Garwood, New Jersey

TO THE layman, who assumes that the job of getting crude oil out of the ground and moving it to where it can be refined is a simple one, all talk of cleaning problems is confusing. But the oil-field man knows only too well that even in normal times his cleaning problems are serious and that in wartime they are greatly intensified by the pressure of production for war.

There are many of these problems and a single satisfactory and economical cleaner and method applying to all of them is impossible, because cleaning of technical equipment and apparatus is not just a simple washing operation. The right cleaning material must be selected for the individual problem and a method of using that material adopted which will insure effective and economical results.

In this article, the major cleaning problems met with in the oil-field and pipe-line operations will be discussed in turn and methods and types of materials suggested which are best suited to the particular cleaning problem.

But before going into these details, it seems advisable to set up a number of desirable factors to look for in considering both a cleaner and its method of application.

The cleaner should be safe to handle and to use.

That is, no cleaner should be used which presents a hazard to workers in its use, if a safe cleaner is available which will do a satisfactory job. It so happens that some of the cleaning jobs in the oil field call for strong cleaners which do require caution in handling. Here again the decision as to which cleaner to use should be made on the basis of relative safety in handling. If in this range of strong cleaners one type is capable of doing a satisfactory job without presenting the dangers of burns or injuries to the extent that other available cleaners do, it should be the one chosen. In general, with the developments which have been made in industrial cleaning materials in the past few years, relatively safe cleaners are available for practically every cleaning operation and completely safe cleaners are obtainable for most.

The cleaner should be safe to metals and materials of construction.

This seems obvious, but the fact that there are materials in use which are not safe makes it necessary to emphasize the point.

The cleaner and cleaning method should be as simple as possible, with minimum dependence on technical supervision.

Another apparently obvious point, but many of the cleaning operations in actual use are needlessly complicated.

The method and material should give speedy results.

There is no justification for slow cleaning methods, when speedier operations are possible. Added cleaning costs due to slow methods often make questionable many a cleaning job which is nevertheless desirable and necessary from the long-haul viewpoint of service life and replacement costs.

The cost of cleaning from the overall point of view must be kept as low as possible.

Adequate cleaning routines almost invariably lead to longer service life of equipment and apparatus. But the investment has to pay dividends in order to justify itself. Hence final cleaning results obtained at such high costs that the benefits they lead to cannot offset cleaning expenses are of no real value.

However, it is highly important that cleaning costs be considered from an overall point of view. The cost of any cleaner per pound is no measure of its actual cost. Be sure that you measure the relative cost of any cleaner or cleaning method on the overall comparative cost per square foot cleaned, considering not only the speed of the operation and the labor involved, but the number of pounds of cleaner required to make up and maintain an effective cleaning solution.

Cleaning Derricks and Derrick Floors

The clinging greasy, oily dirt of derricks and derrick floors is hard to remove effectively and economically. Yet cleaning is necessary, not only for insuring safe operating conditions, but to prepare for protective painting whenever required.

A new emulsifiable solvent cleaner recommended for this operation is sold as a concentrate, mixed on the job with kerosine or safety solvent, one part cleaner to eight parts solvent to make the cleaning solution.

Derricks and derrick floors are readily cleaned with this solution, without need for steam or any source of heat. The cold mixture is sprayed on all surfaces to be cleaned, using a portable spraying tank with suitable nozzle. It is then allowed to soak in for about 15 minutes, after which all surfaces thus treated are flushed off with cold water under pressure. This completes the cleaning operation.

No scrubbing or scraping is required on 90 percent of the jobs. The cleaning mixture has the property of penetrating deeply and quickly into the oily-dirt deposits, loosening the bond between them and the surfaces being cleaned. When the stream of flushing water under pressure hits the surface of the deposits it knocks away the loosened dirt, which is carried away in the emulsion which is formed by the water with the cleaning mixture.

Where dirt accumulations are heavy and of long standing, the initial treatment with the cleaner will remove most of the dirt, but it may be necessary to repeat the treatment accompanied with scoring or scratching of thick deposits during the soaking-in period to insure speedier penetration of the cleaner. More than two applications are rarely required—and in fact, on most derricks

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the single treatment is completely satisfactory.

This method of cleaning gives very clean surfaces with a minimum of time and labor, which can be painted when dry with no further cleaning treatment. In addition to the convenience and economy of working perfectly in cold solution without need for heat, steam or steam guns, the solution itself is non-poisonous, non-flammable at ordinary temperatures and completely harmless not only to the human skin, but to all metals and other materials of construction.

Cleaning in the Engine Room

Drilling Engines—Cooling Systems.

Radiators and blocks of both oil and gas engines tend to scale up rapidly due to the high lime content of the cooling water used in oil-producing areas. These waters are also often high in silicates, with a corresponding tendency to increase the deposits in the cooling system.

Adequate cooling and consequent efficient and economical engine operation, as well as maintenance and repair costs depend on the kind of routine set up for keeping the cooling systems of these engines free of deposits. It should be noted at once that the alkaline cleaners commonly used for radiators are not very effective in removing the heavy lime and silicate deposits found in oil-field engines. Their chemical nature demands the action of an acid for complete and effective removal.

Modern chemical ingenuity makes it possible to use acids for this purpose. The answer is the use of an inhibited acid cleaner which will attack and dissolve the deposits without any danger of attack on the ferrous metals of the cooling system. Such inhibited acid cleaners are available in liquid and solid form. For oil-field engines, the liquid type is more suitable, because of the heavy nature of the deposits. This cleaner is a stable liquid acid compound developed especially for the removal of the type of scale encountered in the oil fields. It also attacks and removes rust in the system. It is harmless to ferrous metals and presents no hazards either to the equipment or to the operator.

For soft scale or light rust, the solid type of cleaner is effective. It is a stable, acid compound in granular form, less rapid in action than the liquid type. In fact it should not be used for heavy scale unless the need for at least three times the contact time is recognized and allowed for. The granular type is, of course, easier to ship and handle but its relatively slow action must be carefully considered.

To clean individually-cooled engines, the cooling water is first drained from the system. Then a solution made up of 1 part acid cleaner and 1 part water is circulated for 4 to 6 hours through the block—the time depending on the thickness of the deposit or the frequency with which you clean the cooling system.

The easiest way to circulate this cleaning solution is to set up an empty oil drum, connected with an acid pump, which serves as a supply tank and receiver for the solution as it is pumped through the block.

After 4 to 6 hours, all harmful scale, rust and other deposits will be removed, without damage to the metal of the system. Then the block should be thoroughly rinsed by flushing through with clear water for a half hour or more, followed by a final security treatment with a dilute solution of a moderately alkaline cleaner to insure complete neutralization of the last traces of acid in the system. Such an alkaline cleaner can be obtained which will also tend to prevent rusting of the system when used in this final security treatment in a 4-ounce-per-gallon solution.

Instead of this circulating method, a soak method can be used. Here the liquid cleaner solution, made up 1 to 1 as in the case of the circulating method is poured into the radiator until foaming stops, allowed to soak in for about one half hour and then removed. The system is then rinsed as before and the security treatment given.

Where a group of engines are cooled by water from a tower or central water source, the water is drained from each engine and the cleaning solution circulated through the blocks of each engine in series.

In using the granular-type cleaner for less heavy deposits, the cleaning solution is made up at 8 ounces per gallon of water and circulated 4 to 6 hours. The soak method is not practical for this cleaner, because of its slow dissolving action.

Drilling Engines—Sludge Control.

Drilling engines, like any other internal-combustion engines, tend to form sludge in the lubricating oil, with materially harmful effects.

Not only can harmful sludge be removed from engines which have been allowed to accumulate heavy deposits, but the formation of sludge can be prevented. These two objectives may be accomplished by the use of a special compound designed for the purpose. This material is a neutral, non-corrosive sludge deterrant, which is mixed with the lubricating oil. It contains no chlorine compounds, graphite or other solids and has the added virtue of giving products of combustion which are also harmless and non-corrosive. Hence it has no harmful effects of any kind on interior engine parts.

The compound has the unique property of spreading over and adhering to metal surfaces to provide a protective coating which prevents the accumulation of sludge deposits. It also improves the penetrating and spreading power of the lubricating oil. Hence it not only aids greatly in the lubrication of the engine in operation, by preventing adherent sludge deposits in oil lines and other readily clogged openings, but insures lubricating-oil coatings on such areas as the cylinder walls when the engine is idle. It tends to improve the quickness and easiness of starting by improving the oil seal at piston rings.

It prevents the accumulation of harmful sludge deposits by inhibiting the oxidation of the oil and by dispersing sludge throughout the body of the oil.

Gas Engines

In dry-gas engines, this compound is added to the lubricating oil in the proportion of 1 part to each 12 parts of oil, to prevent sludge formation. It is assumed that you start with a well purged or otherwise cleaned engine interior and that initially the material is mixed with fresh oil.

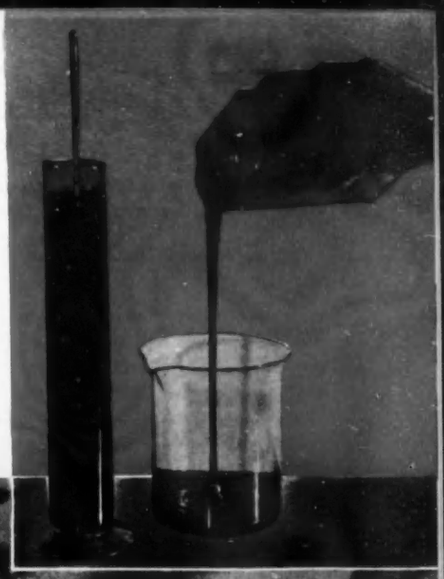
This same concentration is maintained in the crankcase by adding the same proportion of the sludge preventative each time oil is added to the crankcase. As long as it is thus maintained, the tendency of sludge to build up and stick to engine surfaces is practically eliminated. It is particularly valuable in locations where heat conditions tend to carbonize heavy sludge deposits —such as at valves and rings. Where a wet fuel is used, the concentration is reduced to 1 part in 16 of oil.

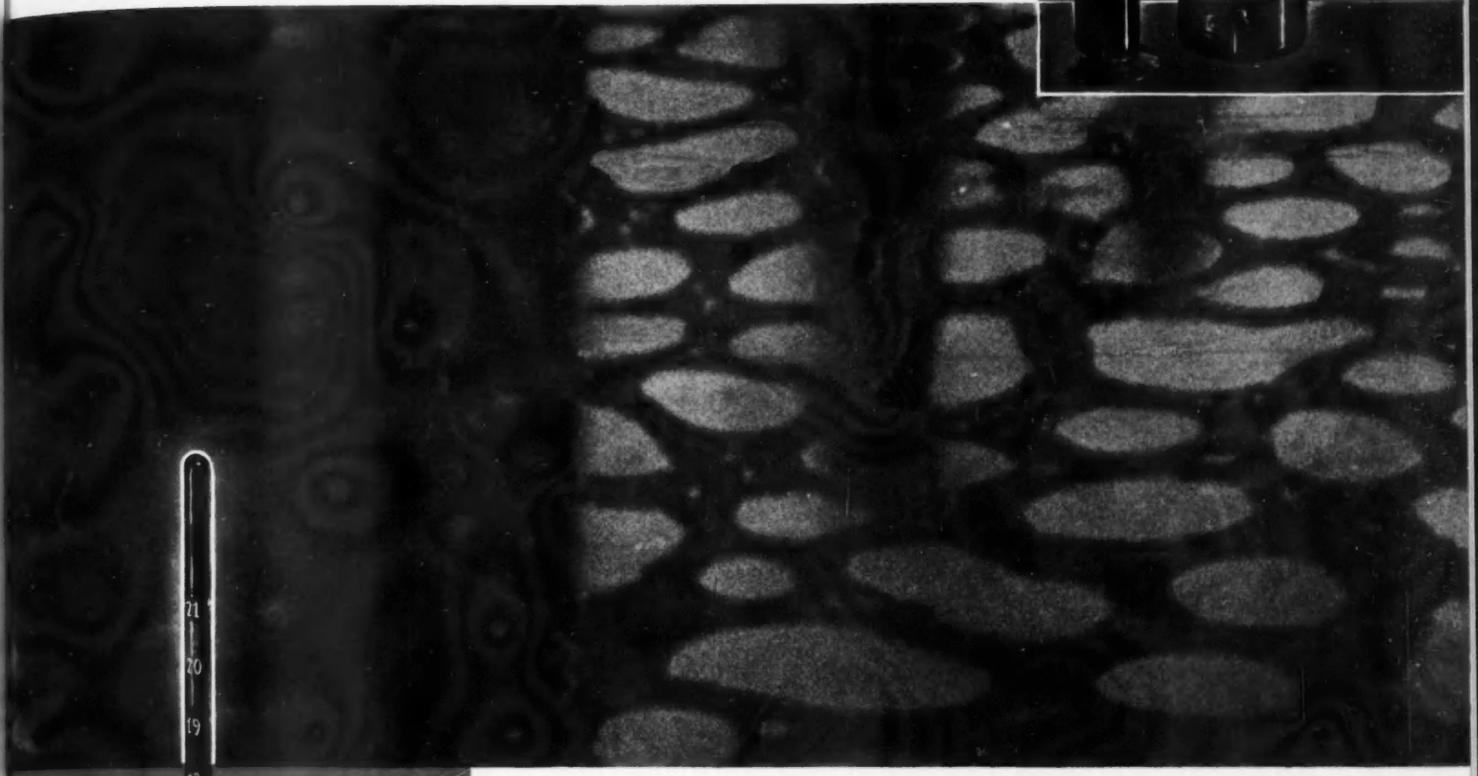
The treatment just discussed is for the prevention of sludge deposits. But where sludge has accumulated, the same compound can be used for removing harmful sludge. Here, in dry and wet fuel engines, all old oil is first drained from the crankcase. Then it is filled with the cleaning material used without dilution as shipped, to the regular oil level. The engine is then idled for one half to one hour.

At the end of this period, the crankcase is drained. All harmful sludge is removed with the compound, which has penetrated, loosened and dispersed the deposits from all interior areas. Then the crankcase is filled with treated oil as outlined above.

It should be noted that if the sludge condition has persisted for a long time, sludge itself may have been acting as an oil seal around old or leaky gaskets. Hence when the sludge is removed, oil leaks may take place. Under such conditions, gaskets should be replaced after purging. Also, in extremely severe sludge conditions, it may take longer

High Efficiency Dehydration for Low Gravity Crude Emulsions





Heavy crudes, so much in demand these days, often present a difficult treating problem. While the Petreco Electric Process effectively is dehydrating emulsions involving crudes over a wide gravity range, it always has been highly successful in treating low gravity crude oil emulsions.

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than usual for the material to penetrate into the smaller openings of oil lines.

Engine-Room Floors, Engine Exteriors, etc.

Engine-room floors can be quickly and safely cleaned by the use of a solvent soap type of cleaner which combines the usual detergent action of a good soap, with special solvent action.

This unusual soap is a completely neutral material, supplied in the form of a heavy light brown jelly, which is quickly soluble in either hot or cold water and works equally well in both. Very little of this soap is required for a cleaning solution, since for most purposes, a teaspoonful per gallon is ample.

It penetrates oily and greasy dirt deposits with great speed, loosening their bond to any surface and tending to dissolve and disperse the oil or grease content. Hence very little scrubbing or brushing is required when this cleaner is used.

It acts as a deodorant and disinfectant as well as a cleaner, while its strong pine odor is a deterrant to insect infestation. It rinses off completely and easily, without streaking or leaving a film.

In cleaning engine exteriors, floors, walls, woodwork and the like, the dilute solution of about one teaspoonful per gallon of water is brushed or sponged on the surfaces to be cleaned. Then the surfaces treated are easily rinsed off with plain water.

The soap is harmless to all metals, wood and any good paint and does not affect the skin in any way.

Power Houses

Condensers.

The problem of cleaning condensers and heat-exchange equipment is probably the most difficult in the oil field, in that dirt deposits are stubborn and, unless the suitable cleaner is used, the equipment has to be dismantled for a good cleaning job. Yet adequate cleaning is of the utmost importance, because effective and efficient heat transfer depends on the elimination of any deposits which interfere with metal-to-cooling-agent contact.

This cleaning job can be done readily without dismantling of equipment, if the cleaner used is of the proper strength. Note, however, that the caustic alkalies which are sometimes used for this purpose are too strong and too hazardous.

A heavy-duty alkaline cleaner, compounded so as to provide adequate alkaline action, without the hazards of a strong caustic content, is highly suitable for this cleaning operation. The solution used is usually about 8 ounces of cleaner per gallon of water, which is circulated through the tubes of the condenser at as close to boiling temperature as possible for 8 to 10 hours, followed by a thorough rinsing with clean water.

This is usually accomplished by setting up a supply tank in which steam coils or an open steam line maintain the solution at close to boiling. This tank feeds the solution to the tubes, after which it is pumped back into the tank. The tank should be provided with three baffles, in order to insure the settling out of dirt carried over from the tubes and preventing it from being carried back into the unit. The supply tank should be large enough to provide solution in the amount of the full capacity of the equipment being cleaned. It pays to set up a routine cleaning schedule for this equipment. When you wait until a drop in the efficiency of heat transfer is noted, dirt accumulations in the condenser have already reached the point where cleaning is difficult, with the possibility that only dismantling will insure a good cleaning job. When a routine cleaning schedule is consistently followed, the system can be maintained in clean condition at all times. The frequency of such cleanings depends, of course, on the nature of the water used and other local conditions, but once established, the intervals between cleanings can usually be relatively long, if regular cleaning is persistently followed.

Sand Filters.

Where sand filters are in service for boiler water, slime deposits may tend to clog them, particularly in spring and summer, when conditions are favorable for the growth of the micro-organisms which cause these deposits.

The same slime-removing compound used by paper mills for controlling slime deposits in the water used for paper making is very effective in cleaning sand filters.

The filter bed is first treated with a 2-ounce-per-gallon solution of this compound, in sufficient volume to cover the top layer of sand when all outlets are closed. This solution is then dropped into the sand bed and allowed to stay in contact with the dirt deposits for about 12 hours. At the end of this period, all slime deposits, however deeply embedded, will have been loosened so that the ordinary air or raking treatment, combined with back flushing, will completely remove them.

Flue Cleaning.

Soot deposits in fireboxes, flues and boiler tubes may be taken for granted, but it is well to remember that they retard efficient heat transfer, tend to cause corrosion and are always a threat of chimney fires.

They can be kept under control easily by the use of a flue cleaner, available in the form of a heavy powder which is spread lightly against the hot walls of the firebox with an ordinary hand sprayer of the type used for dry insecticides. A scoop can also be used.

The heat of the firebox causes the cleaner to volatilize and combine with the soot deposits and cause them to drop down into the fire where they are burned, or else carried out of the flue by the normal draft of the boiler. Treatment is carried on with the fires banked or with burners turned low. About one small handful of cleaner is ordinarily required per square foot of grate area.

This cleaner is non-combustible and non-explosive. Safe and easy to handle, it has no harmful action on the skin and will not attack metals, fire-clay or refractories.

Sludge Control in Fuel.

The heavy oils often used in oil-field boilers offer the same sludge problems as the Bunker C oils used in industrial plants. Sludge deposits formed in oil-storage tanks tend to clog screens, feed lines, burner orifices and other parts of the system, with a corresponding reduction in efficiency of combustion and interruptions in service.

This sludge can be controlled readily by suitable treatment of the oil in storage tanks. Moreover, the same compound that prevents sludge formation can also be used to disperse sludge in badly-sludged tanks without need for mucking out.

This compound is a non-volatile oily liquid, readily combustible, which has the property of dispersing the sludge contained in heavy fuel oil throughout the body of the oil, so that the resulting mixture of oil and dispersed sludge will burn as readily and efficiently as the oil proper. When added to the oil, the material also tends to reduce viscosity materially, often by as much as 15-20 percent. Hence treated oils are more efficiently burned, with corresponding increase in fuel economy.

The same compound is also used to prevent accumulation of sludge in heavy-fuel oils, being added to the oil at the time it is pumped into the supply tank.

One pint of the material to each 1000 gallons of oil added to the tank will effectively prevent sludge formation and reduce viscosity from 10 to 20 percent.

For cleaning sludge deposits from fuel-storage tanks, 1 pint of the material is added to the fouled tank for each 400 gallons of total content (oil and sludge). Within a period of from a day to a week (depending on the amount of sludge) the deposit will have been completely dispersed. Very heavy deposits may require a second treatment.

Cement Floors.

Cleaners used for cement surfaces should be carefully selected, since the

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wrong type of cleaner will not only give poor cleaning results, but materially shorten the life of the floor.

What is required is a cleaner which combines carefully controlled alkalinity and penetrating power with effective wetting action, so that the cleaning solution can penetrate deeply into oily and greasy deposits, breaking the bond between the dirt and the cement surface and allowing it to be flushed away with relatively little need for brushing and scrubbing. An effective cleaner for cement floors should also have the added ability to whiten and harden the cement, since these features can be readily provided.

Such a cleaner is very easy to use. It is provided in the form of a readily soluble solid, which is sprinkled lightly over an area of about 10 square feet of the wetted cement surface to be cleaned. Then the surface is brushed lightly with a heavy bristle brush, working the material into the dirt with water. A few minutes of brushing is all that is required for normally dirty floors. Brushing is followed by hosing off or brushing off with clear water.

The emulsifiable solvent cleaner recommended for derricks and derrick floors is also adaptable to cement floors, particularly those which have become stained by long contact with heavy grease or oil deposits. The regular 1 part cleaner to 8 parts kerosine mixture is used. It is brushed on the stained area and allowed to soak in for about an hour, after which it is flushed away with water under pressure.

Oil Storage Tanks

Exteriors—Maintenance Cleaning.

The special solvent soap discussed under engine-room floors and engine exteriors is particularly well suited to the job of cleaning the exteriors of oil-storage tanks of oil stains, either for maintenance purposes or prior to repainting. This soap is particularly easy on aluminum-painted surfaces.

The same dilute solution already recommended is used—one teaspoonful per gallon of water. This solution is brushed on the surfaces to be cleaned with a long handled brush, working it into the dirt deposits. Rinsing with a hose or by brushing leaves a bright, clean finish on the painted surface, without streaking or filming. Fresh paint can be applied to the cleaned surface without further treatment, if stripping is not required.

The emulsifiable solvent cleaner can also be used for this cleaning job.

Exteriors—Stripping for Repainting.

A heavy-duty alkaline cleaner of the type described under condensers is well adapted to the job of stripping old paint from tank exteriors. This cleaner provides a more penetrative and less alkaline solution than the strong caustic solutions formerly used. It causes the paint to strip off in comparatively large flakes and so loosens the coating that it can be removed by high-pressure steam or water.

This cleaner for use in stripping is made up in a hot solution of eight ounces to a gallon of water. A convenient set-up for the purpose is to use an empty oil drum of about 100 gallons capacity, located about 10 feet above the highest part of the storage tank to be stripped. An open steam hose is provided for heating and a water valve for filling. A hose of about ¾-in. in diameter is connected to the tank with a 4-foot length of ½-in. pipe at the other end, fitted with a flat nozzle, giving a thin sheet, rather than a round stream of stripping solution. This set-up will provide a suitable pressure head for the solution.

The hot solution (close to boiling) is flowed on to the tank surface, starting at the top and working downward. It is best to work over a limited area, allowing the solution to work into the paint for about five minutes. Then the softened paint is flushed off with a steam jet or a stream of water at high pressure.

When the entire surface of the tank has been stripped in this way, it should be given a thorough water rinse, since traces of unrinsed cleaner will affect the bond of the new paint job.

One application of this cleaner will strip about three coats of paint. Thicker layers will call for additional applications.

It often is desirable to thicken the stripping solution to provide for holding it on the surface long enough to insure effective stripping action. This is readily accomplished by adding a paste of cornstarch (one pound per gallon of water) to the solution.

Interiors—Maintenance Cleaning or Stripping.

The same heavy-duty cleaner is used for cleaning the interiors of oil-storage tanks prior to repairing or to the application of anti-corrosion coatings. It is used at the same strength, eight ounces per gallon of water, being sprayed over the surfaces to be cleaned, followed by a thorough water rinse. This solution can also be used effectively in a steam gun for this cleaning operation.

Note that although the alkalinity of this cleaner is less than that of strong caustics, it should still be used with the ordinary precautions recommended in handling caustics.

Workers exposed to the spray or splashes of the solution should be equipped with rubber boots and gloves and suitable eye goggles.

Tank Cars and Tankers

Tank Car Exteriors.

The solvent soap recommended for storage-tank exteriors is equally valuable for cleaning exteriors of tank cars and is used in the same way. Where a central cleaning station method is employed, a similar type of cleaner based on silicate detergents is in wide use. Here a 4-ounce-per-gallon solution is sprayed over the tank car from an overhead supply tank. The car then moves into a cleaning zone where the solution soaks in and is brushed well where deposits require it, after which it passes to a final spray zone where the cleaner and dirt are rinsed off with water. Stripping for repainting can be carried out by a similar system, using a heavy-duty cleaner, but as a rule the method usually followed is similar to that described under tank stripping.

Tank car interiors are cleaned in much the same way as are storage tank interiors, with preference for the steam gun method of applying the solution.

Tanker Interiors.

A hot (boiling) solution of heavy-duty cleaner, eight ounces per gallon, is used for cleaning compartments and tanks, working from the top down and allowing a half-hour soak-in period. Then the surfaces are thoroughly rinsed with a steam gun or hot water under pressure.

Salvage Cleaning

The cleaning of piping, equipment and parts is all the more important in these days of critical metal shortages.

The heavy-duty cleaner already discussed will effectively clean all these metal items, putting them in shape so that they can be suitably treated against rusting and safely stored away until needed.

An 8-ounce-per-gallon solution is employed, usually in a large vat capable of holding standard pipe lengths and deep enough to cover the ordinary units cleaned. Piping and other items are boiled in this solution for 15 to 30 minutes, followed by draining and by rinsing in another vat, with hot water. These items usually dry fast due to absorbed heat when removed from the rinse tank.

Where parts have become badly rusted or scaled, they are treated with a 50-50 solution of the solid inhibited-acid cleaner described under engine-cooling systems. A three-minute soak is usually sufficient, following which the regular cleaning treatment just described is given.

When these parts have been cleaned and are well dried (usually, as indicated above with absorbed heat) it is advis-

MORE NECESSARY THAN EVER BEFORE

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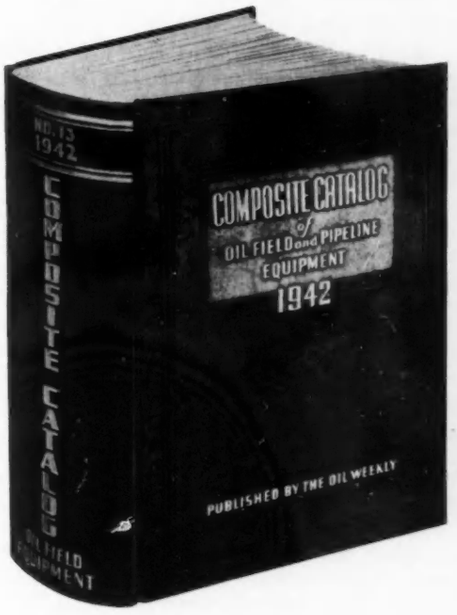

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able to protect them against rust during storage. This is most easily and effectively accomplished by using a novel type of protective coating which provides a thin, tough, dry protective film which sets permanently within 24 hours after application.

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Casing Head Gas Plants

Absorption Systems.

Wax, sludge and sulphide films must be removed from the equipment of absorption plants. The same general methods are used as those described under condensers of power plants. The regular 8-ounce-per-gallon solution of heavy-duty cleaner is employed, being pumped from a supply tank through the entire system. The solution can be used again and again, with suitable make-up to compensate for usage of cleaner in removing deposits. The cleaning operation should be carried through whenever a significant reduction in operating temperature indicates the need for cleaning.

Cooling Towers.

The cooling towers of the absorption system may tend to develop algae and other growths which interfere with proper heat transfer. The slime-removing compound discussed under sand filters for power-plant water will prove equally effective for this cleaning job. The 2-ounce-per-gallon solution is pumped at ordinary temperature from a storage tank through the tower feed lines, replacing the regular water flow during the cleaning period. The solution is thus recirculated until the growths have been removed and can be re-used with suitable make-up. A thorough flushing with water is the only follow up needed before resumption of normal cooling functions.

Pipe Lines

Pumping Stations.

The problem of keeping the cooling systems of gas and diesel engines used in oil-pipe-line pumping stations free of scale, rust and other deposits is just as troublesome as that met with in engine rooms at the fields.

The same methods and materials recommended under oil-field engines apply to these pipe-line engines.

Similarly the control of sludge formation in these engines can be obtained by the methods outlined for oil-field engines.

Compressors.

Formation of hard carbon in the cylinders of compressors is a serious problem of pipe-line operation. This can be readily prevented by the use of the solvent soap already discussed under engine-room floors, engine exteriors, oil-storage tanks, and other points in this article. A solution made up of one part of this soap in nine parts of water is injected into the cylinder through the lubricator, with the oil supply cut off. The compressor is then run for three hours with this solution as lubricant in the cylinder, after which the feed of lubricating oil is resumed.

The solution penetrates and softens the carbon deposit, the softened carbon blowing out through the exhaust.

Routine use of this method on a fixed schedule of treatments provides good insurance against the all-too-frequent blowing out of cylinder heads as a result of excessive deposits of hard carbon.

Tank Farms

The same methods suggested for cleaning oil-field tanks can be used for pipe-line storage tanks.

General Cleaning Problems

Company Houses.

Cleaning the premises of company houses between tenants can be greatly simplified and improved by the use of the solvent oil soap previously discussed. This soap is not only a highly economical cleaner, providing a speedy, penetrating action for dissolving grease and oil, but is particularly useful in cleaning painted surfaces without attack and without forming streaks or films when rinsed.

In addition, its disinfecting and deodorizing action is highly desirable. Experience has shown that in premises regularly cleaned with this soap, insect infestation is eliminated. The pine-oil odor of the compound is repellant to all common house pests.

Note that in addition to company houses this soap provides a very satisfactory cleaning medium for company washrooms, toilets, and all other locations where a deodorizing and disinfecting action is desirable.

Hand Cleaning and Skin Protection.

The worker in the oil fields is primarily a mechanic. His hands get as dirty as those of the metal worker and he is fully as much exposed to the dangers of infection from cuts and abrasions as well as to various dermatoses.

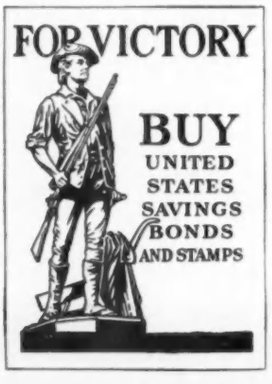
The surest means of controlling the time lost from work resulting from skin infections is the supply of a safe and effective hand cleaner in plant washrooms. Effective hand cleaning requires a detergent strong enough to penetrate and disperse the oily dirt without robbing the skin of the natural oils. When too strong a cleaner is used, the effect of removing these natural oils is chapping and cracking—a wide open invitation to infection.

Moreover, an effective scouring agent must be used, to insure speedy removal of dirt without time-consuming and harmful prolonged brushing and scrubbing. Yet the scouring agent must not be so harsh as to abrade or cut the skin.

The most effective hand cleaner is one that contains a properly balanced alkaline cleaning material and suitably graded and selected pumice. When the right degree of alkalinity is provided, the pumice works as an effective scouring agent to remove the embedded dirt particles which are unaffected by ordinary soaps. Sand and other harsh abrasives must be avoided and at the same time too mild a scouring agent such as corn meal should not be used for oil-field-hand washing, since they are not strong enough to handle the kinds of dirts encountered. (On many other industrial hand-cleaning operations, the vegetable type scouring agent is completely satisfactory.)

A suitably compounded hand cleaner of this type will leave the hands soft and smooth, with no tendency toward chapping or cracking. Yet it will clean the dirtiest hands in minimum time without prolonged scrubbing and brushing. There is no irritation to cuts and abrasions and no tendency toward the spread of localized infections. The best preventative of industrial dermatoses is thorough hand cleaning with a safe but effective hand-cleaning compound in powdered form.

The cleaning problems of the oil field are unusually varied in their nature, but like any other maintenance problems of industry, their successful solution depends primarily on the establishment of a routine for cleaning which is persistently followed. Choice of cleaning material and method is an important part of the solution, of course, if adequate cleaning and low overall costs are to be obtained. But the routine is the key to consistent results.



Given Materials, California Can Meet All Consumption Needs

CALIFORNIA'S oil fields can more than supply the volume of petroleum needed to meet present requirements in their marketing territory and also to keep abreast of wartime demands in the Pacific area.

And, given sufficient materials to carry on normal drilling operations, the state can continue to meet the oil needs of the West Coast.

This is the view of California oil executives well qualified to appraise the supply situation on the basis of facts so far made available to them as to the nation's oil needs in the Pacific. Furthermore, should demand factors be revised sharply upwards to fill Pacific war needs, requirements could still be met, they assert, from California sources without resort to proposals being advanced for a pipe line to augment the California supply from West Texas and New Mexico.

Immediate consideration must be given to increased drilling in California fields if the state is to continue to keep abreast of increasing demands should this prove to be a long war, they point out. If early relief from present restrictions is not forthcoming, the impact on the state's ability to carry on adequate drilling operations may be serious.

Losing Men

Handling of equipment allocations is being reflected in the industry's manpower supply. Experienced drilling crews are being rapidly depleted in California. Top men are being drawn into West Coast shipyards and other war industries at an alarming rate. Additionally, the Selective Service boards are not recognizing the critical character of oil industry men and the draft has made heavy inroads into the state's drilling manpower.

Constant employment of materials and manpower is a first essential in the oil business. If California, or any other oil state, is to maintain its ability to produce petroleum in sufficient volume to satisfy the nation's needs, it can only do so by constant and continued drilling of more and more wells. When drilling is halted, or substantially reduced, the industry's ability to supply oil is cut in direct ratio.

Since priorities on drilling materials have been applied with equal force to all of the oil-producing states. California is not alone among the states where ability to produce oil is being curtailed as a result.

Ability to Produce

For October California's crude oil allocation was 738,000 barrels daily. Based on conservative estimates, the state in that month could have produced at least 835,000 barrels daily, or 14 percent more than the amount assigned by OPC for that period.

The California industry is now making an extended inquiry into the state's ability to produce oil. The 835,000 barrels daily rate of output is the estimated "maximum efficient rate," or a production level that can be maintained over a six-months period without loss in ultimate recovery. This figure is predicated on engineering interpretations of highly technical data and there exists widespread disagreement as to its accuracy, all of it from the standpoint that the conclusion is on the conservative side.

An important element in the industry is of the opinion the only practical approach to determination of the state's production ability is dependent upon actual production tests, to be conducted field by field, which would disclose with finality each field's capacity, and, in addition, the physical facilities at hand in each field in the way of pipe lines, natural gas capacities and other physical equipment with which to move the oil to refining centers.

Oppose Line From East

Inquiry into the feasibility of connecting the West Texas-New Mexico producing areas with California refineries by construction of a pipe line has developed a number of alternative moves which would appear, California oil men point out, to make the undertaking not only unnecessary but a waste of both manpower and materials.

Estimates indicate construction of a 12-inch, 50,000-barrel-daily-capacity line to the Pacific seaboard, 1100 to 1200 miles, would require 100,000 tons of steel and would cost some $30,000,000. To move oil through the line, based on usual ICC tariff rates of 6 cents a barrel per 100-miles, would take between 60 cents and 66 cents a barrel out of the price paid the West Texas-New Mexico producer at the well.

In Kern County, California, is located the Navy's main Elk Hills crude oil reserve, believed to be one of the largest in the state. Before the present war this oil was earmarked for the "next" war. The question now is: "what war is this reserve being held for?"

Oil in the Elk Hills reserve is of 22 gravity and yields 70 percent fuel oil, a quality in most demand now to fuel the fleet and such war industries as railroads, and a quality which Texas-New Mexico fields being considered do not possess. Productive sands in the area are shallow, generally lying 3000 feet below the surface. This is a huge area of untapped flush production from which a few inexpensive wells using but a small amount of steel could readily produce substantially more oil than could be shipped to California by the suggested pipe line.

However, California oil men do not think it necessary to tap the Elk Hills reserve to develop sufficient production to keep abreast of the state's production assignment for an extended period. In one major field, Coalinga Nose in Fresno County, they point out, oil is being produced at a current rate of 31,000 barrels daily. From this field alone, they estimate, more than half the quantity that could be delivered by the suggested pipe line could be obtained over at least an 18-month period without infringing upon the field's maximum efficient rate of output, which means without damage to its wells or impairment of the ultimate recovery to be obtained from the structure.

Drilling Restrictions

Most practical solution to the California supply problem, both from the standpoint of the industry and national self-interest, however, the concensus holds, lies in complete removal of present restrictions on drilling operations. Some considerable amount of drilling equipment and tubular goods for wells now is idle in inventory and is restricted from use by priority rulings. Several million feet of used tubular goods, it is also estimated, could be recovered from existing wells at small cost without impairment of their producing ability.

California producers hold that no useful purpose is being served by keeping drilling supplies idle when the industry is suffering a serious loss of manpower. This drain of skilled workers has already assumed dangerous proportions,

they declare, and within a short time the ability of the state to maintain its oil flow should all restrictions on equipment be removed will be seriously undermined. At the same time utilization of every ton of available material while the manpower is available to use it would result in bolstering the state's producible reserves with each new well completion.

Proven Locations

In the heavy-oil pools of the state alone it is estimated that some 2600 proven well locations now remain to be drilled. A considerable number also are available in light-oil fields, the actual number now being under investigation. Primary reason for the sharp reduction shown to date this year in initial potential of new wells completed is the disproportionate number of completions in heavy-oil fields where the daily rate of output is normally but a fraction of the rates obtained in flush light-oil fields. Drilling in low-gravity fields has been encouraged, however, due to the scarcity of fuel oil and wells planned for such fields given preferred priority ratings.

Rigid rationing of equipment has cut California drilling to a minimum. For example, in the first 9 months this year only 325 wells were completed, compared with 693 in the first 9 months of 1941. Initial output of the 1942 completions averaged but 430 barrels daily per well, contrasted with an average of 1158 barrels daily per well in the 1941 period.

Under present drilling rates California is developing new production which adds to the state's schedules each month about 4000 barrels daily of allowable production. On an over-all basis, the state's fields show an annual decline rate of 10 percent, or over the next 12 months the present maximum efficient rate of 835,000 barrels daily will, at this decline rate, be reduced to an average maximum efficient rate for the full period of 793,000 barrels daily. The 4000 barrels daily each month in new allowable production being contributed by present drilling would, over the 12-month period, offset about 57 percent of the normal decline.

It has long been an axiom in the oil trade that a lot of new knowledge is gathered in the drilling of an oil pool. Regular development of new fields frequently results in discovery of new deep zones and extensions which may increase the reserves of the original pool substantially. Removal of drilling restrictions, therefore, it is argued, could be expected to result in extension of present known producing areas in California and the opening of new deep zones.

Production Increase

At the start of 1942 California's crude-oil production was 624,000 barrels daily. In October this year it averaged 728,000 barrels daily. October output of more than 100,000 barrels daily above the January figure was obtained from 166 unrestricted pools containing 15,160 wells and from 100 restricted pools containing 3800 wells. During October the 166 unrestricted pools produced 331,000 barrels daily, an increase of 31,800 barrels daily over their January average. The 100 restricted pools in October produced 397,000 barrels daily, an increase of 68,200 barrels daily.

The unrestricted pools were considered to be producing at their capacity, whereas the restricted pools could have increased their output rate 107,000 barrels daily and still remain within their so-called maximum efficient rate of flow.

The October quota for California was 738,000 barrels daily, whereas the rate of output averaged 10,000 barrels, or 1.3 percent below that figure. The state's failure to meet its production quota is credited largely to the proration system under which it is operating wherein each well in the state is treated as a separate unit and should one well encounter mechanical or operating difficulty and be off production for all or a portion of the month, there is no way by which its allowable production can be transferred to another well and the state's over-all production total maintained exactly at the allocation assigned to it. Reasons for well shutdowns range from shortage of repair materials, shortage of manpower in the fields, failure in shipping facilities, or from any one of a dozen reasons including economic considerations in the producing operation.

Settlement of the oil supply question in California would be realized with the release of sufficient materials to permit the state to again conduct its development operations at a normal rate, the industry believes. Under the present setup, however, it can anticipate in 1943 only about 40 percent of its normal needs. This, it is understood, will be allocated first to maintenance and repair of facilities; second, to wildcat exploration; and third, to development work in proven fields under a "selective" program which will result in development of the largest practicable volume of the most needed quality of oil at the point where the need is greatest.

Drilling in light-oil fields in California has been practically at a standstill for the past year. Most of the 100 restricted oil pools in the state are producers of high-gravity oil but a number of them, such as Wilmington and Santa Maria Valley, produce low-gravity oil. Included in these 100 restricted pools are fifteen major fields in which production could be increased considerably above the October rate without stepping the flow above the estimated maximum efficient rate.

The following table lists these fields, together with the estimated maximum efficient rate set for each, the average output for each in October this year, and the indicated additional volume of production that was available but not utilized during October:

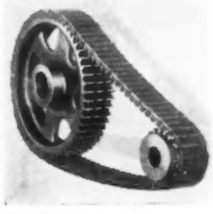
FIELD	Max. Efficient Rate Nov. 1942 B/D	Production October B/D	Present Additional Available Production at Efficient Rate B/D
N. Belridge	8,389	4,309	4,080
Coalinga NE & Nose	62,000	40,794	21,206
Coles Levee & RIL—West	27,740	16,967	10,773
Greeley	13,800	6,458	7,342
Kettleman No. Dome	58,100	38,868	19,232
Rio Bravo	19,400	7,474	11,926
Ten Section	24,000	12,542	11,458
San Miguelito	4,200	3,907	293
Newhall-Potrero	5,550	4,085	1,465
Ventura Avenue	44,060	42,897	1,163
Coyote West	12,535	11,272	1,263
Dominguez	26,800	23,759	3,041
Huntington Beach New	20,020	19,318	702
Inglewood	22,605	19,341	3,264
Wilmington	97,840	95,716	2,124
Total 15 fields	447,039	347,707	99,332
Other fields	388,011	380,403	7,608
STATE TOTAL	835,050	728,110	106,940

The above statistics identify most of the fields in which production could be increased in Californa without impairment of their maximum efficient rate. As indicated earlier, accuracy of data upon which these maximum efficient rates of production were set is now the subject of inquiry. No one in the industry will argue that they are not on the conservative side. If it is insisted by OPC or others that the efficient rates can be substantiated at present levels, then the industry is likely to ask the opportunity to conduct a state-wide flow-test to prove its point.

Data presented by the Sub-Committee on Petroleum Economics of the Petroleum Industry War Council indicates that California has nearly 35 percent of the nation's surface inventories of petroleum products. The subcommittee's study indicated that at the end of 1942 stocks east of California would approximate 387,000,000 barrels. At the end of September stocks held in the Pacific Coast territory were reported by the United States Bureau of Mines at 131,550,000 barrels.

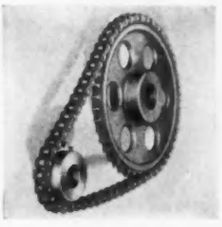
In the first 9 months of 1942 total stocks in the Pacific Coast territory were reduced 10,127,000 barrels, of which the major part (8,731,000 barrels) of the total reduction was credited to fuel-oil stocks. Total inventory of fuel oil at the end of September was reported at 45,187,000 barrels. In the first 9 months of 1941 stocks in the Pacific Coast territory were reduced 8,186,000 barrels, the reduction in fuel stocks accounting for 6,731,000 barrels of the total.

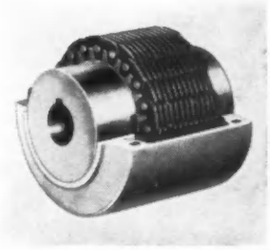
AN IMPORTANT ADVANTAGE IN PLANNING POWER DRIVES



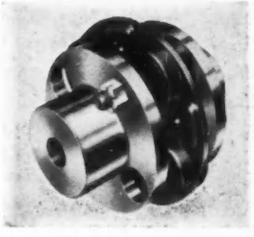
Morse Silent Chain Drives operate at practically 100% efficiency, year after year. Quiet and smooth in operation, they insure maximum machine output. The Morse principle of "Teeth, Not Tension," means no slip—no wasted power. Wide range of chain capacities.

Morse Roller Chain Drives are equipped with effective "oil feed" system in every link. This exclusive design gets oil to the heart of chain. Oil gets in, wear stays out! They last longer, require less maintenance. Interchangeable and available in single and multiple widths.

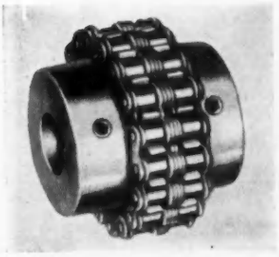




Morse Silent Chain Couplings compensate for shaft misalignment. This simple and rugged coupling consists of two facing steel sprockets wrapped with Morse Silent Chain—enclosed in a machined split case. Links acting on sprocket teeth form flexing medium. They are easily installed and available in many sizes.



Morse Morflex Couplings contain two steel hub members and a floating center unit assembly to which each hub is separately connected through resilient rubber trunnion blocks. There is no metal on metal movement. Rubber allows for maximum distortion without loss of efficiency. Cuts maintenance cost.



Morse Roller Chain Couplings embody many outstanding features that make for unusual flexibility and long-life. Highly compact, they consist of two facing sprockets wrapped with Morse Roller Chain. Easy to install and align. Wide range of stock and special sizes—covers if desired. Send for coupling data today.

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Shallow Wells To Be Drilled Without Water Casing Strings

THE industry's dangerous drilling bottleneck created by the current shortage of steel for well casings may be at least partially offset by the development of a procedure for drilling without use of water strings.

Complete operating drawings, plans, engineering specifications and full procedural directions covering methods for drilling of wells with a contemplated saving of about 85 percent in steel have been released to the oil producers of California. The procedure will be tried out immediately on six wells in the Wilmington field of California, and it is understood two large companies operating in Texas also plan to test it.

The proposal is not looked upon as a cure-all, as it probably will work successfully in only a portion of the drilling operations. It will be tried on shallow wells, and it is in this classification that it probably has its best chance of success.

The new drilling procedure was invented and perfected by Robert V. New, president of Continental Development Corporation of Los Angeles, in conjunction with F. A. Graser, petroleum engineer, and M. L. McGee, superintendent, of that company.

The new procedure requires no new tools, and Robert New announces that patents have not been applied for, nor are contemplated. All designs are thrown open for the free use of the oil industry, but vigorous means will be used against all persons seeking to obtain patents on any part of the procedure for their private gains. In making his offer to the oil industry, New said: "We had been facing oil supply trouble in California and the Pacific ever since Pearl Harbor. With the East Indies in the hands of the Japs, California is faced not only with the necessity of supplying its own leaping industrial demands for fuel oil, but the Army and the Navy, to say nothing of the needs of the United Nations throughout the Pacific, have been drawing heavily and dangerously on our residual fuel oil reserves.

"In fact, not only the California industry, but Washington as well, has been more and more disturbed over the oil shortage rapidly developing. A survey made by the Los Angeles Office of Harold L. Ickes, Secretary of the Interior, as well as Petroleum Coordinator for War, in conjunction with a Cali-

Procedure for Drilling Oil Wells Without Water Strings

(Refer to illustrations on opposite page)

FIGURE 1 shows a hole drilled to the bottom of the oil zone having the hole reduced with a tapered shoulder in the shale immediately overlying the oil zone. Figure 1 also shows a liner being lowered into the hole on the drill pipe. The liner is composed of a gravel prepacked screen on bottom, a steel taper (to fit the taper in the hole) immediately above and attached firmly to the blank casing, a metal petal basket also on the blank casing, a cementing collar, additional blank casing, a machined swage, a length of casing of increased size and an adapter. The distance from the top of the perforations to the cementing collar is usually five feet. The entire length of blank pipe should be about 100 feet and the enlarged portion should be about 25 feet long with its top in a shale body. The perforated screen could be conventionally perforated or prepacked as shown depending upon the condition and size of the sand to be screened.

Inside the liner is a tail piece which at its upper end is screwed to the bottom of the adapter and which at its lower end has a cementing tool for cementing through perforations.

FIGURE 2 shows the liner landed and hung on the tapered shoulder of the hole by the steel taper attached to the blank casing. The setting tool has been released from the adapter and the cementing tool has been raised to a position for cementing through the cementing collar. The casing is centered by the stabilizer at the top of the liner and by the taper at the point of reducing the hole.

FIGURE 3 shows the liner cemented and the tool lowered again for washing out excess cement leaving the hole and liner clear of cement. After washing out the cement, the cementing tool would be raised to the enlarged portion of the liner and circulated for an additional time during the setting period of the cement or it could be removed from the hole and the drill pipe rerun with a small bit. The hole should be kept open by circulation during the entire time that the cement is setting.

FIGURE 4 shows the blank casing gun-perforated immediately above the cementing collar. It also shows a two packer tester on the bottom of the drill pipe for testing the shut-off. This method of shooting for a water test is approved by the California State Division of Oil & Gas. It should be mentioned that the holes should be shot in shale if the sands are unconsolidated. Thin streaks of sand could cause trouble if gravel packing is necessary. Therefore it is advisable that the hole be cored at the depth where the gun perforations are made.

FIGURE 5 shows the liner after testing. It also shows tubing in the hole set on a bottom hole packer resting on the machined swage at the base of the larger casing. The machined swage allows an additional precaution of a lead seal or a seal of other packing material.

It has been found advisable at times for cleaning oil wells to have the hole tubed to bottom but to have the tubing above the perforations for pumping. By running a 1¼" tail piece below the 2½" tubing, the tail piece can be removed through the 2½" tubing after swabbing. The tail piece can be fastened in position similarly to the inner barrel in a full-hole core barrel and can be removed by the sand line with the same safety features. After cleaning the well, a pump shoe can be run on the sand line and a bottom lock pump can be used.

A drilling mud of low water loss and with a thin filter cake should be a prime requisite. Sand should be almost completely removed from the mud. This requirement will add safety to getting the liner at the required depth, keep the hole open while waiting on cement, minimize the need for washing or acidizing the perforations, and give the operator a reasonable chance to remove the tubing from the liner for a short period after landing. Also the hole should be kept full of mud of good quality at all times during the drilling operations and for several days after completion.

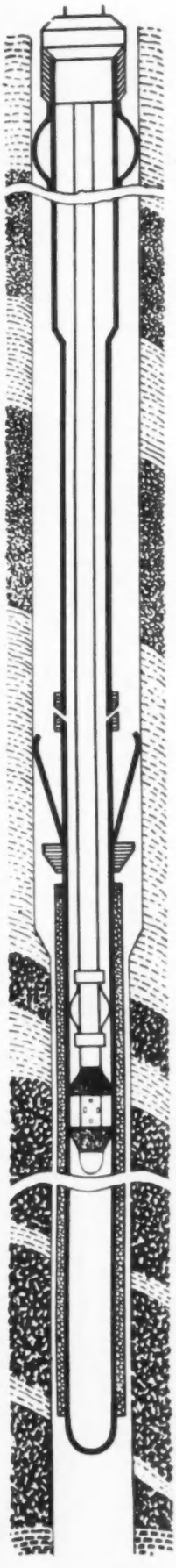

FIG. 1

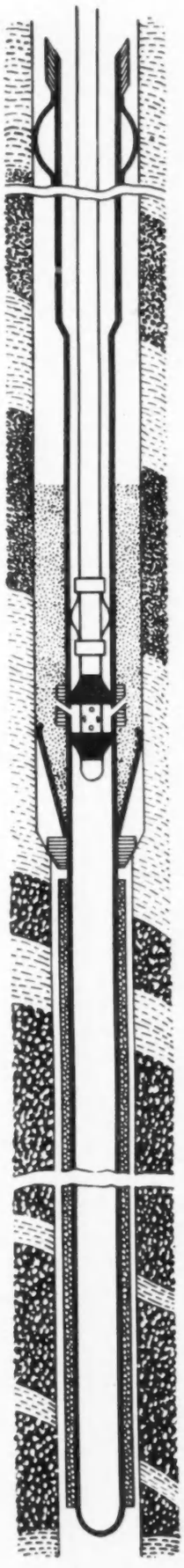

FIG. 2

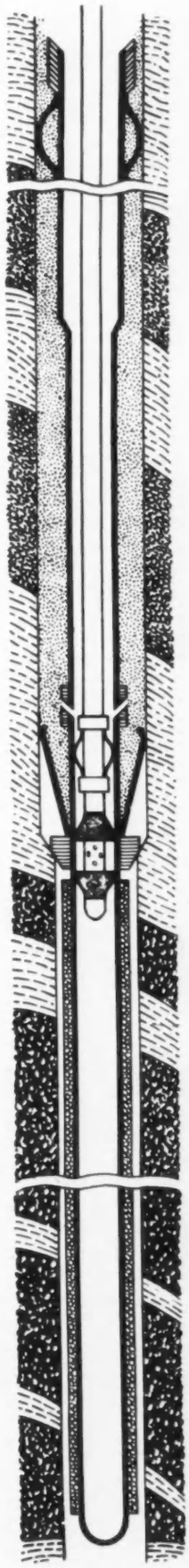

FIG. 3

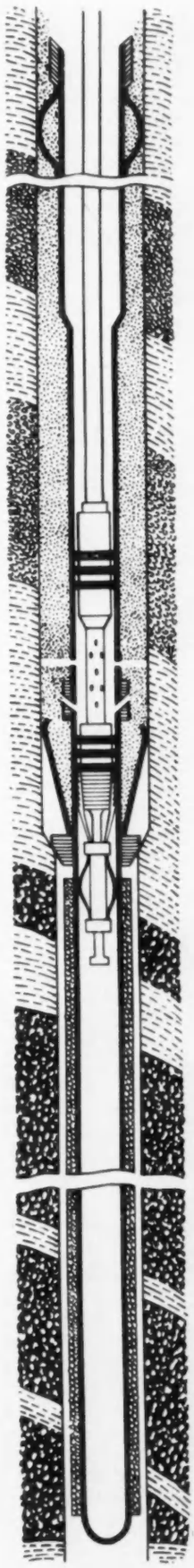

FIG. 4

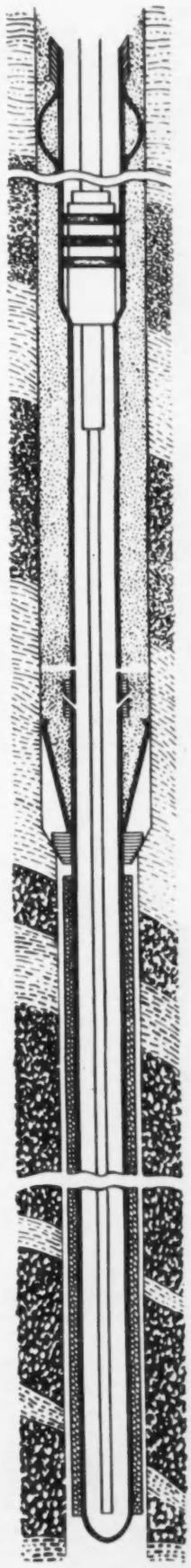

FIG. 5

fornia Oil Industry Committee, determined that there were proven locations for more than 2500 shallow heavy oil wells in California. It is estimated that these wells would require some 7,500,000 feet of casing. This is in addition to the casing requirement of the hundreds of deeper wells that must be drilled.

"There is available in California, a total of something less than 3,000,000 feet of casing. The new procedure for drilling shallow wells without casing, while not a cure-all, was designed to occupy that 'no-man's-land' between the necessity of drilling the wells and the lack of casing with which to drill them. No tools new to the oil industry are involved but the entire method can be carried out with the use of equipment of already proven utility.

"The cost of drilling a 3000-foot well in California by the new procedure is estimated to not exceed $12,500 compared to a cost of $35,000 for a 3000-foot well three years ago. A year ago, Continental Development Corporation drilled seven wells in the Wilmington field at a cost of $20,000 each which then appeared to be a record low cost for such wells in this area.

"All details of the New procedure have been presented to the Petroleum Coordinator for War, in Washington and, after consultation, at the request of Robert E. Allen, Assistant Deputy Petroleum Coordinator, Continental Development Corporation has agreed to immediately drill six wells in the Wilmington field, using the new method.

"It is understood that at least two major oil companies in Texas are planning to use the method immediately for the drilling of shallow wells. It is interesting to note that the drilling of 5000 wells in the United States under this system would effect a saving in steel tonnage, represented by the elimination of casing, sufficient to build 15,000 medium tanks or enough badly needed tankers to haul 650,000,000 gallons of aviation gasoline per year for our armed forces, even allowing 90 days for each tanker trip.

"The method used in this drilling is simple. It is only the old story of the boy who took a watch apart and put it together again, so it would run, and yet had enough parts left for another watch.

"An old well can be taken apart and put together again, not impairing its production value, and with parts left over to almost fill the steel needs for another well. Practice in the past has been to employ large steel casing, containing smaller steel tubing within. By means of the new procedure, the tubing can be removed from a large number of existing wells, which can then be placed back on production with only slight alteration to the pumps, and the tubing thus removed used to drill a new well without casing."

WASHINGTON ROUNDUP

[*Continued from page 12*]

year ago and during the period from early June to the middle of October drilling actually ran about 10 percent ahead of 1941; geophysical exploration also is being carried on at an accelerated pace, with 26 percent more crews working in October than in the same month last year, he explained.

A further difficulty in subsidies, he went on, is that there is no particular merit in just drilling holes in the ground and there is not fixed relationship between the number of wildcats drilled and oil produced.

The industry now, Jacobsen told the subcommittee, is drilling second, third and even fourth class prospects because of the paucity of first class ones and, he contended, if the industry by itself and without any subsidy "or shot in the arm" will drill between three and four thousand wildcats a year, there would be no particular reason for subsidizing the drilling of those wells.

"The only purpose of a subsidy, it seems to me, would be to get wells drilled that otherwise would not be drilled," he commented.

One result of a subsidy program, he pointed out, would be to open up a lucrative field for promoters of well participations.

From now on, Jacobsen said, the oil found will have a higher cost than oil now being produced from previous discoveries. Oil today, he declared, is undoubtedly being sold at less than replacement cost, although not necessarily below its original cost—the best argument, he said, that could be offered for a price increase.

Higher Price Needed

A price increase, he argued, would prolong the life of the stripper wells, would justify the adoption of secondary recovery methods if fields where such expenditures now would be prohibitive, and would justify drilling and development in "borderline" fields, where anticipated recovery is such that an operator could barely break even at present prices.

Jacobsen agreed that the discovery rate has declined in recent years, but said the picture could be lightened by realizing that when initially brought in, new fields are figured at the proven reserve and the prospects are recomputed as the proven area expands. As a result, he said, total reserves have increased slightly each year up to last year.

The best incentive to increased exploratory work, he maintained, would be to remove from the industry the fear of elimination of the depletion allowance and the privilege of charging intangible drilling expenses to cost, as well assurance that no effort would be made to require companies to capitalize their geophysical expenses. The Treasury, he said, is attempting to do these things, creating uncertainty.

Further, material and equipment should be made available, and the manpower problem should be dealt with so that the industry could keep the skilled labor necessary for the production of the oil for which the military services are calling.

Jacobsen was asked by Lea how long the industry could retain its capacity to produce if the wildcat program was dropped, the witness declaring that the effect would be felt almost immediately and would increase from week to week.

The possibility of a million-barrel increase in demand as the war progresses was raised by Congressman Boren of Oklahoma, who expressed grave fears that the industry may be unable to supply all the gasoline needed when the output of planes and tanks reaches the objective set by the Administration.

As Boren dwelt upon the dangers of a short supply for the military, Wolverton asked the witness what effect an increase in the price of oil would have upon the Eastern supply situation, Jacobsen agreeing that it would have none.

"If the urging of the petroleum coordinator had been heeded a year before it was, this situation would never have occurred," the New Jersey Congressman asserted.

Wolverton's insistence on fighting out the price controversy moved Lea to remark that "we are trifling with some very important things, including oil" and "questions of price, wildcatting and ceilings are unimportant, and the sole question is if more oil is going to be required how are you going to get it."

Ickes Hits WPB

Full responsibility for delaying the "big inch" pipe line and the construction of necessary 100-octane gasoline facilities was laid at the door of the War Production Board by Coordinator Ickes.

Appearing before the subcommittee without any prepared statement, Ickes said he had nothing to add to what had been said by previous OPC witnesses but would be glad to answer questions the first of which, from Representative Holmes of Massachusetts, was how could the conflicting statements of some 28 agencies dealing with oil be eliminated.

Ickes had no solution to offer to that problem, other than to have all statements issued through his office, which he admitted was impossible of achievement.

The coordinator revealed that a few

hours before his appearance before the subcommittee, he had filed an application with WPB for priorities on steel for a 20-inch products line roughly paralleling the "big inch" line, to carry 200,000 barrels daily, its construction being estimated to require from nine to twelve months.

He told the subcommittee that construction of the first leg of the "big inch" carrier will be completed by December 15 but that, because of delays by WPB in granting priorities for pumps and other equipment, it would not start operations until at least January 15. Further, he said, the line had just received a new set-back as a result of the "kidnapping" of its skilled labor by Henry Kaiser to build ships in the Northwest.

Ickes said that not only have the dilatory tactics of the War Production Board delayed the Texas-New York pipe line, but the 100-octane gasoline program also has been held up by failure to grant priorities on time.

Oil Men Ask Higher Prices

At its November 25 session, the subcommittee got down to what, for the oil men present, was the really important subject—that of price.

Representatives of the independent drillers and producers warned the subcommittee that an involuntary "strike" is in the making because they are being forced to curtail operations.

Sid W. Richardson, Fort Worth operator, testified that he stacked all his rigs in July and now has no development work going on, either wildcat or proven acreage, although he has properties that could be developed.

As a result of proration, ceilings and lack of transportation, producers operating on borrowed capital in Texas have gone from a three-year to a six-year payout, he said, but the present uncertainty is leading banks to want to cut loans to less than five years. Also, he said, costs of operation and production, not including finding or development cost, have increased to the point where the overall cost is an even exchange for the price.

Second Recovery Stressed

Secondary recovery methods, which may increase potential recovery by billions of barrels, cannot be undertaken at current prices, it was declared by Donald P. Oak, Tulsa operator, who said producers felt that if no better crude prices were in sight they would be financially stronger if they salvaged their properties but are keeping on producing because of the Nation's need.

Like other operators, Oak said a 50-cent increase was needed to keep the producers on an even keel. With such an increase, he declared, a considerable amount of secondary recovery effort would be expended where production can be secured at the rate of 2500 to 3000 barrels per acre, but a $1 increase would be required to induce the working of areas which would produce 1000 to 2000 barrels per acre.

"Operators have done considerable preliminary exploratory work in many fields to determine the possibility of secondary recovery and many of them already have plans made to go ahead as soon as they are able if material is available and the price structure is increased 50 cents at once," he said. "I estimate that in Oklahoma alone there would be 50,000 barrels of secondary oil per day by March 1, 1944, which would steadily increase to 100,000 barrels."

Material needs for this work would not be great, but there would be a need for cable drilling tools and contractors, he explained. Also, he added, the manpower situation is growing steadily more critical, due in part to the disparity of wages between oil producers and war plants; it would be necessary to get a price increase in order to raise wages to the point where labor would be retained and attracted to the oil fields.

Answering questions by Lea, Oak said that prior to 1941 gasoline taxes were absorbed by the crude price, estimating that a one-cent tax represented 25 cents per barrel, and an increase in price would merely enable the producers to get back that tax money.

Asked about the desirability of a subsidy, he asserted flatly that it would not promote production and said the industry is suspicious of the proposal, believing that no one man would be able properly to determine who should and who should not receive Government money.

Lea also indicated his skepticism of the proposal, asking whether the witness believed a subsidy could be administered without scandal.

Secondary recovery also was discussed by Forest Dorn, president of Forest Producing Corporation, Nowata, Oklahoma, who declared that, in general, one third of the oil was recovered by flowing and another third by pumping and as much as was secured by either method could be produced by the following application of secondary methods. However, he warned, secondary recovery must be undertaken before a field is closed in, since it is economically impossible to abandon wells and later go back and reopen them.

Dorn told the subcommittee that the cost of secondary recovery is very high, ranging from $1000 an acre in Oklahoma to $3500 in Pennsylvania, but that it could be encouraged by assurance of safety in price and tax allowances.

Reserves Being Strained

Voicing impatience with the thinking of some Administration officials that there is plenty of oil, H. B. Fell, Ardmore, Oklahoma, told the subcommittee that the industry today is not producing all the oil required and for the past seven months has been withdrawing crude from storage at the rate of 100,000 barrels daily.

Demand next year will be in excess of what it is now and may eventually reach 4,500,000 to 5,000,000 barrels a day, he warned. This will impose a strain on our reserves which, if worked too hard, will not release anything like the 19,500,000,000 barrels estimated to be stored below ground.

Fell said also that premature abandonments are increasing, further adding to the undue depletion of reserves, and while he agreed with previous witnesses who said some increase in output could be secured in West Texas, New Mexico and a few other areas, called attention to the declining output in Oklahoma and said that while a daily average of 4,500,000 barrels might be achieved it would drop back in a short time to 4,000,000 barrels.

Barriers to increased exploratory and development activity, he said, include the uncertainty raised by subsidy proposals, the present price ceiling, increased costs of discovery and production, lack of manpower, the Treasury's attack on the depletion and intangible drilling expense allowances and its effort to have geophysical expenses capitalized, and the lack of balance in the supply of materials.

He asserted that a "substantial increase" in price and reversal of the above factors must be given. The price of oil today, he said, determines production two years from now.

Supporting Fell's statement, Boren declared that the tank and plane were "sired" by oil "but in this war we have been treating oil as the stepchild of the tank and plane." Two-thirds of all the tonnage moving from this country to the various theatres of war consists of oil, he said, emphasizing the need to consider the supply of oil even before that of tanks, planes and other equipment, since without oil the latter would be useless.

Need Men and Materials

Contract drillers are being held back by a lack of labor and specialized materials, it was testified by Howard P. Holmes, president of Two States Drilling Company, Dallas.

"If the present rate of drilling opera-

tions is to be maintained we must lose no more men, particularly those out of our more highly skilled brackets," Holmes said. "If we are to be asked to step up the rate of our operations, even by a very small percentage, we cannot do it immediately, and when we can, it must be done by raiding other labor pools for untrained men, which we in turn must train for our less responsible types of work."

The present supply of the capital materials of machinery is adequate for the drilling of the present program, but the situation in repair parts must be improved and the supply of special items, such as drilling bits, drill collars, drill pipe, etc., must be improved and, if the drillers are to run for six months, materials must be allocated at once.

Wildcatting will not be undertaken at present frozen crude prices, it was contended by J. P. Coleman of McCarty & Coleman, Wichita Falls, who said the independents "simply do not have the money to drill enough wildcat wells."

His own company, Coleman told the subcommittee is in process of liquidation, explaining that "when any producer stops looking for new reserves he is liquidating his company."

"In the long run," he argued, "the way to obtain the greatest amount of oil at the lowest price is to have fair and reasonable crude prices that will encourage orderly exploratory drilling on a constantly increasing scale."

L. M. Moffitt of Triangle Drilling Company, Shreveport, urged amendment of WPB Order M-68 to permit the finding of additional reserves through deeper drilling on well defined structures now producing from shallower formations, maintaining that many wells that have ceased to produce could be deepened and probably find productive sands below the exhausted horizon and requiring the use of a minimum amount of new steel.

Amendment of the order, permitting this without the necessity of applying for an exception and a high priority rating for materials, he said, "to my mind offers the opportunity of adding to reserves quicker than the search for new producing structure."

"It might be well to add that failure to maintain adequate reserves during World War No. 1 resulted in a price increase to $3.50 per barrel before adequate production and reserves were again available," he commented.

High taxes and low prices are already beginning to invoke the law of diminishing returns, it was declared by John L. Herschback, Dallas drilling contractor, who urged that the price and other recommendations of previous witnesses be adopted and suggested that an increase of one or two cents a gallon be made in the price of fuel oil.

Don't Gamble With Oil

The industry presentation was closed by William R. Boyd, Jr., chairman of PIWC, and Russell Brown, general counsel of the Independent Petroleum Association, who stressed the necessity of protecting the industry upon which our success in war depends.

"I don't think we ought to gamble with the oil situation," Boyd said, paraphrasing a similar statement by Jeffers with respect to rubber.

"No living man knows how long this war is going to last. No living man knows how much oil is going to be used. No living man knows the quantity of oil we can produce over a long period of time.

"I take the position that over 80 years of history it has been demonstrated that the way to get additional oil reserves is to pay the price for them. It is an historical fact that in the oil business that when prices have gone down oil drilling declines and when prices went up the oil drill operated."

Organized Rationing Opposition

Evidence of an organized campaign to kill nation-wide gasoline was laid before the subcommittee by Director William M. Jeffers, who showed postal cards which have been sent to Washington, printed in idential language.

Jeffers said that between five and ten thousand postals have come in and, in addition, "thousands" of letter addressed to Stabilization Director James F. Byrnes have been sent to his office where, he told the subcommittee, they had not been opened.

The rubber director charged that the campaign is a concerted drive to prevent rationing, financed by "people who ought to know better." The effort started in Indianapolis and has spread to other parts of the Middle West.

Jeffers attributed resentment against rationing to the fact that there is plenty of gasoline west of the seaboard states, drawing from Lea a sharp retort that there is "something anomalous in restricting the use of a plentiful article to restrict the use of a scarce article."

Lea made it clear the members of the subcommittee object to the "arbitrariness" of the rationing program, and pointed out that when it made its last report to Congress in July it was not convinced that rubber could not be rationed directly. Other members of the subcommittee chimed in, Boren commenting that the restriction of gasoline to save rubber was "like amputating a leg to cure a toothache."

A six-month postponement of nation-wide gasoline was recommended to the subcommittee November 25 by spokesmen for a bloc of 147 members of Congress who are fighting that formula for saving rubber.

The views of the bloc were presented by Representative Hatton Sumners of Texas, chairman of a special committee appointed by the group, and Congressman Clinton P. Anderson of New Mexico, who challenged assertions of OPA and rubber officials that supplies of rubber are inadequate.

It was also disclosed that Representative Joseph Martin of Massachusetts, House minority leader, had called a meeting of the New England delegations for December 1 to discuss the Eastern oil situation, and in the Senate six Western Senators asked the creation of a five-man committee to investigate the situation and Senator Truman announced that Jeffers, Ickes, Eastman and Henderson would be the first witnesses at his hearings on the extension of rationing.

Sumners told the oil subcommittee that a minor revolution is brewing throughout the country as a result of unbridled beaurocracy in Washington, that the people of the Nation are fully aware of their responsibilities in the war and are prepared to make any necessary sacrifice but are becoming restive under the expense of the steadily expanding Government payroll and the unreasonable requirements of Administration officials.

He asserted that driving has been curtailed greatly by voluntary action and urged that the situation be fully explained to the people and they be given a chance to get their mileage down of their own accord before regimentation was resorted to.

Declaring that the growing beaurocracy of OPA is un-American, Sumners asserted that "voluntary conservation will save rubber and save democracy." It would be different, he said, if "this beaurocratic outfit was making a demonstration of efficiency."

Boren told Sumners that he agreed with him and that the order for nation-wide rationing was a "usurpation of Congressional authority" which had never been delegated to the Administration, adding that he was preparing to introduce a resolution forbidding rationing of gasoline in areas where there is no shortage of supply, although he admitted there was little chance of its adoption in time to head off the OPA order.

The American public will have to ride on such rubber as it now has on its cars until well into 1944 at the earliest, it was declared by L. D. Tompkins and

Colonel Bradley Dewey, assistant deputy directors under rubber "czar" William Jeffers.

Both officials of the Baruch-inspired rubber directorate stressed that the critical period, so far as rubber is concerned, will occur about next August, when demand will reduce stocks of available crude to the very limit of safety while no great amount of synthetic will yet be available.

While the outlook for 1943, with what Dewey designated its "valley of death," is none too bright the prospects for 1944 are far more optimistic, although admittedly the production of synthetic in anything like the quantities projected will depend upon the speed with which the now-building chemical plants can make their test runs and iron out any "bugs" that may develop, the subcommittee was told.

Tompkins testified that the stock of natural crude on October 31, last, was 465,325 tons in this country and 670,000 tons in all nations outside the axis, although only some 66,000 tons of it was in England. This stock, he said, must last until either synthetic becomes available in large quantity or imports can be resumed on an adequate scale. Currently, consumption of virgin crude is running about 29,000 tons a month for all purposes, military and civil.

Imports are coming in at an average of 2000 tons a month, with a "lucky" month in September when 7000 tons were received. During 1943 it is hoped to bring in between 35,000 and 50,000 tons from South America.

Government-owned scrap stocks on October 31 were 589,000 tons, which is being reclaimed at the rate of 25,000 tons monthly now and will be increased by the end of the year. Additional stocks are in the hands of dealers, not yet turned over the Government, and some further rubber, possibly 10,000 to 12,000 tons a month, is expected to come in from the public.

Present production of synthetic rubber is approximately 1500 tons a month of Buna S, Neoprene, Thiokol and Butyl, Dewey said.

Plants are now under construction for the production of 533,600 tons of butadiene and 210,000 tons of styrene, which will begin to come into production in January, although slowly until late next summer.

By late 1943, production of all types of synthetic is expected to reach the rate of over 800,000 tons annually, but 1943 output will probably not be more than 300,000 or 350,000 tons and that only "providing all goes well," he said.

Also under construction are plants for the production of 220,000 tons of butadiene from alcohol, which will begin to come into production in January.

Dewey told the committee that the rubber director is sending a four-man mission to Russia to study their methods of manufacturing butadiene. Germany, he said, is believed to be making its butadiene from calcium carbide, but has collected quantities of rubber from the countries it has taken over.

☆

ROAD OIL: To provide additional residual fuel for war industries and to conserve transportation, storage facilities and manpower, OPC on November 25 called for discontinuance of the use of slow-curing road oil and requested that the number of grades of petroleum asphalts and surfacing materials for paving purposes be reduced from approximately 27 to 17 standard grades.

Announcing Recommendation No. 61, Coordinator Ickes admitted that the 17 grades provided for may not be the most desirable for use generally throughout the country but said that a suitable and serviceable pavement could be obtained, and the elimination of unnecessary grades will tend to increase refinery through-put and eliminate "hundreds" of modifications of asphalt specifications.

☆

BUREAU WORK: Construction projects of the Bureau of Mines, ordered halted by WPB October 20, were authorized to be continued November 25 following a review of protests filed by Secretary of the Interior Ickes.

Permitted completion, Ickes anounced, were the new installations at the helium plant at Amarillo, Texas, the synthetic oil plant and the laboratory and pilot plant for the hydrogenation of coal. It was disclosed that the helium installations not only included the project at Amarillo and the Cliffside Gas field, but also a new helium plant, and four additional helium plants estimated to cost $11,000,000.

Although WPB originally ordered all construction discontinued and Ickes protested, he made no secret of the fact that he had ordered the work to go ahead without interruption, on the ground that WPB didn't know what it was doing.

Investigations by the Bureau of Mines into the hydrogenation of coal have been broadened to include an analysis of the crude oils made from coal to determine their possible uses in various fields of industry, it was reported by the Interior Department November 24.

"Every dime and dollar not vitally needed for absolute necessities should go into WAR BONDS and STAMPS to add to the striking power of our armed forces."
—*President Roosevelt*

EVERYBODY EVERY PAYDAY 10%

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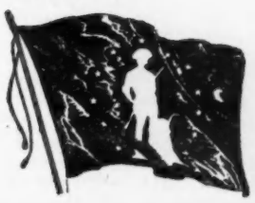
Along with increased war production goals go increased costs . . . extra billions which must be raised, and raised fast, to win this war. That means we must raise our sights all along the line, with every firm offering every American with a regular income the chance to buy more *War Bonds*. YOUR help is asked in encouraging employees to put at least 10 percent of their pay into War Bonds every payday, through the Payroll Savings Plan. For details of the Plan, approved by organized labor, write, wire, or phone Treasury Department, Section T, 709 12th St. N. W., Washington, D. C.



U.S. WAR SAVINGS BONDS

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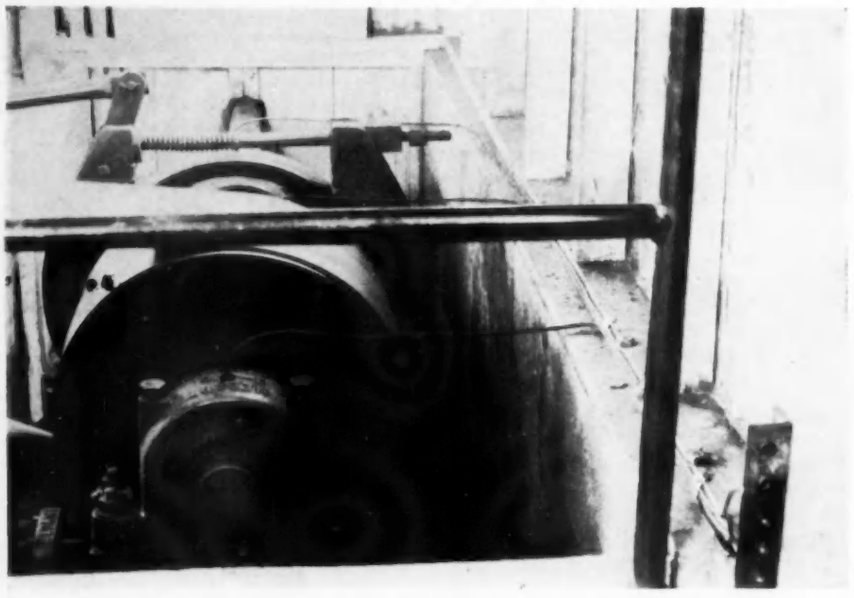
THE OIL WEEKLY

PRACTICAL OPERATING *Hints* FOR

1. LUBRICATION

Extension Lines and Header Cut Oil Time



Remote fittings for applying grease gun eliminate work in pit and possible injury to operator, allowing shaft to be carried in weatherproof tunnel and thus extending service life.

THE DRIVE-SHAFT bearings on a pumping power, being located in a ditch which in many instances is provided with a cover for additional safety, or which, if in the open, presents considerable hazard to the operator if he attempts to lubricate the unit while it is in operation.

To avoid this risk and to insure more frequent lubrication and thus greater equipment service life, one company taps ⅛-inch leads into each bearing, carrying the leads through the trench to convenient locations on the powerhouse floor. A mount at this point carries the grease gun fittings for the entire shaft assembly, permitting a simple shift of gun to care for all the bearings, regardless of weather, operation or other factors which might induce the operator to postpone the necessary lubrication and possibly impair bearing surfaces.

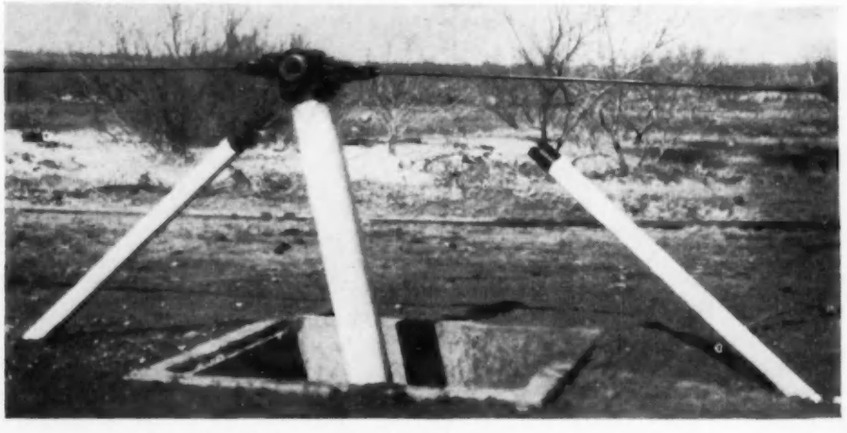
THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston,"

2. ROD LINES

Emergency Bumpers Snub Post Overtravel

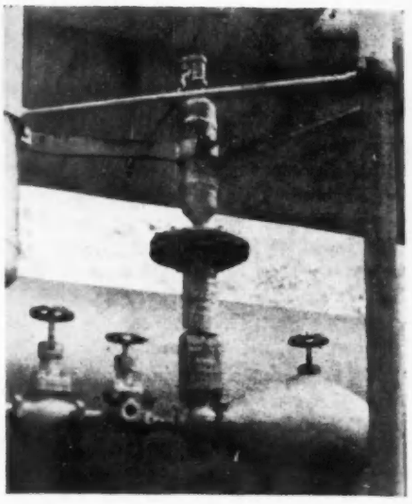
THE MOVEMENT of a surface rod line can be stopped at any predetermined point when bumpers are placed on either side of an inverted pendulum swing. Two-inch pipe imbedded in the ground and leaning at an angle of 45° engages the swing when the movement is more than allowed by the usual pumping stroke of the back crank or pumping power as would be the case in a break of the line. The pumper on the well side would prevent the rods from falling and placing a sudden strain on the jack, while the bumper on the other side would keep the pendulum from striking the concrete walls of the excavation made to house the swing lower bearing.



Damage to rod lines beyond the actual point of breakage occurs if the rods are allowed to drop and foul supports. Snubbers check swing and support line to prevent overbending or kinks.

3. CONTROLS

Auxiliary Support Cuts Instrument Wear



Vibration often causes more wear than operation; proper bracing of heavy unit snubs this.

IF THE control instrument on any part of the processing equipment of a compressor plant is subject to damaging vibration or violent shaking, the instrument can be stabilized by using several pieces of strap iron to clamp around

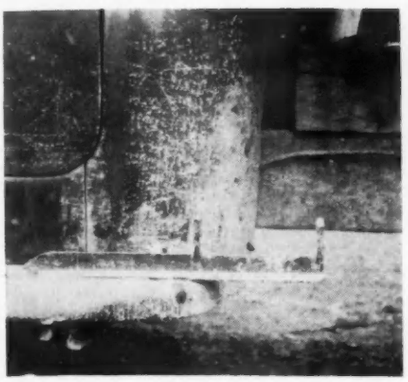
THE PRODUCTION MAN

part of the instrument and anchored to nearby solid risers.

The stabilizers are equipped with a double end at the contact with the instrument so that two bolts are all that may be necessary for attaching. The ends attached to the anchor pipes may be fitted in the way most convenient, but clamps at this point facilitate complete removal without breaking out welded joints.

4. TRUCKING

Safer Driving With Step Scraper Device



Rearward extension of left step carries scraper permitting last-minute cleaning of driver's shoes.

REDUCTION of accidents caused by the truck driver's foot slipping from brake or clutch pedal is obtained by making it convenient for the driver to clean his shoes of mud just before entering the cab.

A scraper, made up of 1"x1" angle iron with two stubs of ⅜" rod welded perpendicular to one web of the angle, one at the end and the other some six inches therefrom, is bolted to and forms a rearward extension of the truck step, at a point where its use is easy, but where it does not interfere with normal use of the step.

Extending into the open, the scraper does not tend to foul the step with mud. It may be cleaned simply by flushing with a hose. If bent or damaged, it may be removed by unbolting, without affecting the step.

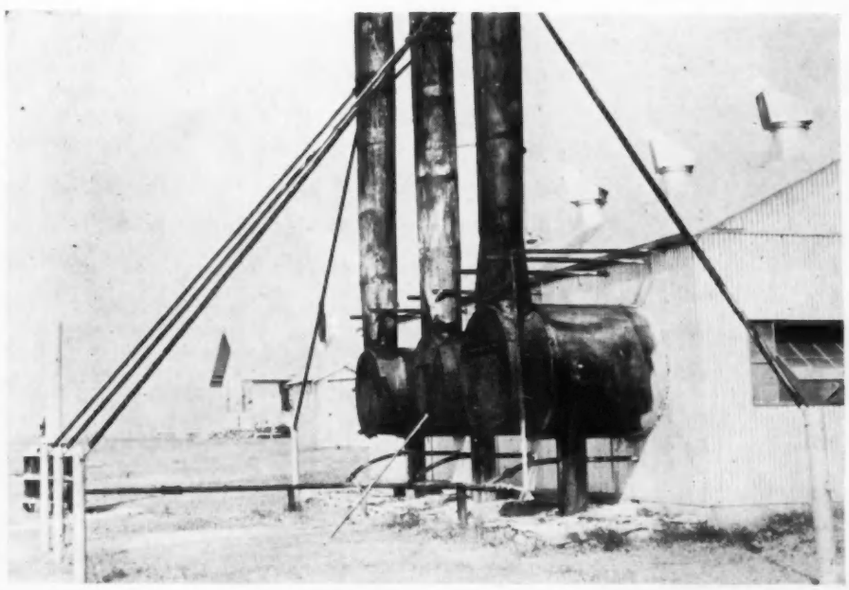
5. BOILERS

Braces Reduce Area Loss Over Guy Lines

RIGID BRACES for permanent settings of oil-field boilers offer better protection to the units than guy wires, and are not the hazard to men around the unit owing to the greater visibility of the supporting material.

By attaching these rigid braces, to pipe posts, set into concrete and extending some three feet above the surface, ample clearance for men and even servicing trucks is provided.

The braces are attached to the posts with bolts through holes near the top of the posts, or the brace member itself may be made with an angle so that a short section fits within the post, being retained there with pin or bolt.



Pipe posts, concreted for stability, anchor short stack braces and provide required rigidity to set-up without introducing hazard of long guy wires sprawled over the lease.

"PD 1-A" and other NEW PRIORITY FORMS

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PD-298 For Steel Plate Requirements. This form must be prepared in quadruplicate by Steel Plate Consumers and received by Producers and the Plate and Shape Unit, Iron and Steel Branch, War Production Board, Washington, D. C., on or before the first day of the month preceding the month in which shipment is required.

PD-299 For Steel Plate Consumption. No requests for steel plates covered by Form PD-298 will receive consideration unless this form is received by the Plate and Shape Unit, Iron and Steel Branch, War Production Board, Washington, D. C., on or before the seventh day following the close of the month reported.

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The Week's News

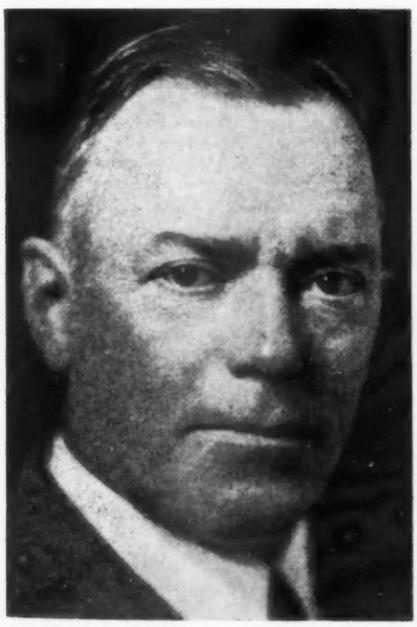
Teagle Quits as Chairman Of Standard of Jersey

The retirement of three members of the board of directors of the Standard Oil Company (New Jersey) who have reached the age limit under the company's retirement policy, has been announced by President W. S. Farish. Those retiring are W. C. Teagle, chairman; E. J. Sadler, vice president, and D. L. Harper. Frank W. Pierce, formerly executive assistant to the president, who has headed the company's industrial relations for nine years, and R. T. Haslam, formerly in charge of research and engineering and later general manager of domestic sales, are the two new directors on the board.

Members of the board may retire at 60, but must retire upon reaching 65. Harper reached 65 a few weeks ago. Teagle and Sadler will shortly reach 65 and elected to retire now to permit their replacement by younger men.

Teagle, upon his resignation as president of the company and his succession by W. S. Farish in 1937, asked to be relieved from the active direction of the company and to accept the pension which he had earned. The board, however, asked him to continue as director and chairman, which he agreed to upon the understanding that he would be relieved from any active work and that he was to receive no salary. Again, in the beginning of 1940, Teagle submitted his resignation, but his associates believed that his experience with the business made it desirable that he continue.

In announcing the changes, Farish said, "it is with deep regret that Teagle has reached the retirement age and we will no longer have the benefit of his counsel. I believe it is the consensus of the people in our business that he has made more of a contribution to the present form and successful operation of the petroleum industry than any other man living.



WALTER C. TEAGLE

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"The influence which Teagle had on the development of the Standard Oil Company in the 20 years he was president cannot be measured by its expansion during that period.

"It was in the early days of Teagle's administration that many of the company's present polices affecting employe thrift plans, insurance, sickness and accident benefits, shorter hours, were initiated. Pierce, who joined the company in 1924 as assistant to the manager of industrial relations, has played a part in the development of this program.

"In 1927 there came into our hands the challenging discoveries of German scientists in the field of hydrogenation and catalytic chemistry. American research engineers immediately started on a program of rapidly expanding application of these discoveries to the chemistry of oil. Out of this program have come better and cheaper lubricating oils, synthetic toluol, 100-octane gasoline, synthetic rubber and many other products crucially important to the winning of the war and full of promise for the post-war world. Haslam, who left the faculty of Massachusetts Institute of Technology in 1927 to come with Standard Oil Company, has been closely associated with these developments—first as an officer of the Standard Oil Development Company and later as general manager of domestic sales."

New chairman of the Jersey board is R. W. Gallagher, who got his start equipped with a pipe wrench and the wish to learn the gas business. He has been successively president of the East Ohio Gas Company, a director of the Standard Oil Company (New Jersey) in charge of all natural gas interests, director in charge of finances and vice president.

Succeeding Sadler and Gallagher as vice presidents, the board elected Wallace E. Pratt and Eugene Holman, both of whom have been directors.

Court Test of East Texas Water Order Likely

Whether there would be a suit over the new water-oil ratio order for the East Texas Field, was the question which confronted members of the Railroad Commission in Austin last week. Owners of west side properties, which would be adversely affected by the order, held several conferences in East Texas. Reports from the field to the commission said that an effort was being made to raise at least $10,000.00 to file and prosecute the suit.

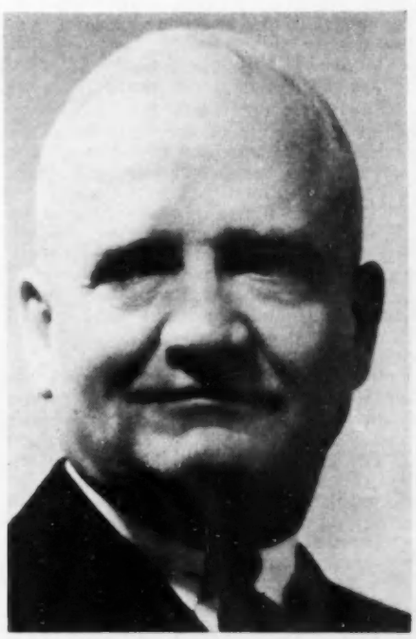
However, late in the week no suit had been filed. Since the statute requires that the commission must be given five days notice on such suits, it appeared unlikely that any action could be taken which would enjoin the order before December 1, its effective date.

Pressure was brought to bear on Commissioners Thompson and Jester to enter the allowable transfer order, the so-called Zeppa plan, as a supplement to the water-oil ratio order.

Proponents of this argument thought that a temporary transfer order would be sufficient because the commission could allow it to remain in effect long enough to permit the completion of the salt water disposal systems, which would take all the water back into the reservoir.

They pointed out that the 10/1 ratio, 10 barrels of water to one of oil, would not conserve enough water. However, commission engineers calculated that this was the ratio that should be entered to assure production of 370,000 barrels of oil daily that would be produced along with about 400,000 barrels of salt water.

In other words, the engineers estimated that 650,000 barrels of fluid could be removed from the field daily without affecting pressures adversely. If 370,000



WALLACE E. PRATT

barrels of oil are produced, the amount for which there is a market now, then the remainder of the 650,000 barrels could be water.

Commission Chairman Ernest O. Thompson pointed out that under this program the commission could adjust the water-oil ratio allowance in proportion to the demand for oil. Thus, if the commission wanted to produce 500,000 barrels of oil from the field, the ratio could be reduced, possibly to five to one, and the additional oil would be forthcoming without increasing the total fluid withdrawal from the reservoir.

The commissioners had not indicated that they would change their position in any respect. In a lengthy opinion, Commissioner Olin Culberson explained his stand against the water-oil ratio order on the basis of conflict with the marginal well law. He pointed to the opinion written by Assistant Attorney General James P. Hart early in 1940, which contained one paragraph flatly prohibiting curtailment of production from marginal wells. This paragraph is set out below:

"Our answer to your fourth question is that the marginal well statute prohibits the Railroad Commission from restricting the production of oil from wells coming within the classification set forth in the statute, and that such prohibition is not dependent upon the findings of the Railroad Commission as to whether or not such restrictions would cause waste or would damage or cause the premature abandonment of such wells. The Legislature has simply taken away from the Railroad Commission any power to curtail the production of these wells, whether or not such curtailment would cause their premature abandonment in fact, is wholly immaterial. As we have previously stated, the Railroad Commission can exercise only such powers as are specifically delegated to it by the Legislature, and in this instance, the Legislature has specifically withheld this power from the Railroad Commission."

Culberson thought also that the commission was powerless to close in a well completely, or to enter an order having that effect, so long as the well is capable of producing some oil. He thought that this would be confiscation, which the courts would not permit.

The marginal well law definition, which opponents of the water-oil ratio order believe renders the commission powerless to curtail production of these wells, is outlined below:

"The term marginal well—means any oil well which is incapable of producing its maximum capacity of oil except by pumping, gas lift or other means of artificial lift, and which well so equipped is capable, under normal unrestricted operating conditions, of a maximum daily capacity of 20 barrels or less (in East Texas), averaged over the preceding 30 days, producing from a horizon deeper than 2000 feet and less in depth than 4000 feet.

"To artificially curtail the production of any marginal limit—prior to its ultimate plugging and abandonment is hereby declared to be waste, and no rule or order of the commission or other constituted legal authority shall be entered requiring restriction of the production of any marginal well."

The majority of the commission, however, contends that since the entire proration statute is based on the prevention of physical waste, the legislature is powerless to prevent the commission from curtailing the production of a certain class of wells, if their production leads to waste. The commissioners believe that proof of waste in this instance, will be a relatively simple matter.

Further than this, in Awoeb Oil Company's case which went to the Texas Supreme Court, the appellate court in its opinion, which was accepted higher up, held that the commission had the right to close in a man's well completely, even though he lost his property—providing that as a result of this program the oil field generally would be assisted materially. In other words, if there is enough waste that can be prevented by closing in a well, the commission has the power to take this action.

In a carefully considered statement released last week, Commissioner Jester said that in discussing the two orders, the engineers who testified said that the water-oil ratio order was the one which would effect the prevention of physical waste. They thought that the Zeppa plan, or transfer order, would not likely succeed because it was voluntary, and moreover it did not assure positive action immediately. Jester expressed the opinion that for the state as a whole, and the East Texas Oil Field particularly, he was firmly convinced that the water-oil ratio order was decidedly the best plan.

Jester pointed out likewise, that in transferring allowables, the commission involved the rights of hundreds of royalty owners, many of whom would not be affected by the water-oil ratio plan. He objected to the Zeppa plan also, because when these rights were involved, the legal authority for such an action was very doubtful, and it would be most unlikely to succeed if the volunteers appeared in insufficient numbers.

Consider Closing Sour Gas Fields in Arkansas

The Arkansas oil and gas hearing at El Dorado, December 16, will take into consideration the advisability of closing to production the sour-gas zones of Dorcheat and Macedonia fields in Columbia County and McKamie field in Lafayette County. Special permits, spacing patterns and a formula of proration designed to give equity among producers will be decided at the hearing.

Awaiting completion of two large desulphurization plants in late spring, 1943, the McKamie Gas Cleaning plant to serve McKamie field, the other at Dorcheat, the Arkansas Louisiana Gas Cleaning Company to serve the Dorcheat and Macedonia fields the sour gas has been wasted to the air and burned. The two desulphurization plants will furnish cleaned gas to the southern terminus of an 18-inch pipe line for the was industries of the state.

Daily production in Arkansas as recommended by OPC is 75,000 barrels of oil and natural gasoline daily, together with approximately 90,000,000 cubic feet of gas, at this time.

Sweet gas from the Cotton Valley series is an approximate 20,000,000 cubic feet per day and an infinite amount of sour gas from the Smackover lime zone which at present is burned is from now operated dually completed wells in Dorcheat and Macedonia fields.

Oklahoma Mineral Industry Conference December 10

The Oklahoma Mineral Industries Conference will be held in Oklahoma Club, Oklahoma City, on December 10. The following program has been arranged:

"Markets and Marketing as Factors in Development of Chemical Industries in Oklahoma," by C. L. Thompson, Thompson-Hayward Chemical Company, Kansas City, Mo.

"Industrial Future of Oklahoma," by George C. Smith, Missouri-Kansas-Texas Railroad, St. Louis.

"Chemical Trends in the Petroleum Industry," by J. C. Walker, Cities Service Oil Company, Bartlesville.

"Oklahoma's Mineral Resources, Oklahoma Coal for Coke to Supply Texas Blast Furnaces," by J. G. Puterbaugh, president, McAlester Fuel Company, McAlester.

"Mineral Raw Materials of the Paint Industry," by K. L. Keating, General Paint Company, Tulsa.

"Oklahoma Oil Field Brines and Their Utilization," by B. W. Logue, The Texas Company, Tulsa.

"Plastic Industry — Raw Materials from Coal and Coke Byproducts, Petroleum and Natural Gas," by A. L. Burwell, Oklahoma Geological Survey.

"Dolomite and Limestone Resources of Oklahoma," by M. C. Oakes, Oklahoma Geological Survey.

"Oklahoma Mineral Raw Materials for Paint Pigments," by W. E. Ham, Oklahoma Geological Survey.

Negotiations Under Way for Sale of Rincon Properties

Negotiations were being consummated in Houston last week for the purchase by The Rice Institute of oil producing and other properties in Rincon field, Starr County, Texas, from the estate of W. R. Davis for $1,047,000.

The property to be purchased represents 29.32 percent of one half of the working interest of the estate, which includes not only oil production but the Brownsville Terminal and the Rincon Pipe Line Company.

Trustees of The Rice Institute entered court at Houston to determine if $500,000 of the school's funds could be invested along with $547,000 donated by Friends of Rice. It is estimated that the investment will yield the school between $10,000,000 and $15,000,000 over a period of years.

The trade involved the sale of Davis estate properties to the Rincon Corporation and the transfer of the properties to trustees of Rice Institute by purchase. John B. Boyce of the firm, Boyce-Smiser, petroleum valuation engineers, Houston, testified that he had been retained by the Davis Estate to evaluate the properties, and explained that there are 134 producing wells in the area and at present 63,000 barrels of oil are produced daily. He estimated the area would produce approximately 56,000,000 barrels of net oil.

Donors to the Friends of Rice fund were Mr. and Mrs. H. R. Cullen, Mr. and Mrs. George Brown, W. S. Farish, Libbie Rice Farish, S. P. Farish, Lottie Rice Farish, Harry Hanszen, H. C. Wiess, Olga Keith Wiess, Mr. and Mrs. Herman Brown and the Anderson Foundation.

Markets Generally Strong As Shortages Continue

Tight markets generally are reported, as supplies are limited by both transportation facilities and scarcities of materials. Gasoline is in strong demand as well as other products, as pre-rationing sales are heavy in the 31 states where restrictions will go into effect December 1. Also evidenced in the markets are the increased demands imposed by the North African military operations.

On the East Coast, all products are scarce, and suppliers foresee increased difficulty in meeting demand. Especially serious is the scarcity of heavy fuel oils, which has become increasingly acute. Heating oils also are tight, being inadequate for fully meeting demand.

Car Shortage

Gulf Coast refiners remain handicapped by the lack of tank cars for transporting products that could be sold. In the district, prices for diesel oil, ships' bunkers, have been generally advanced 10 cents to $1.65 a barrel, under authorization of Amendment 47 to revised Price Schedule 88 of the OPA, effective November 25.

In the Middle West, heating oils are scarce, and gasoline also is difficult to obtain, in reflection of reduced yields at refineries, while it is anticipated that further cuts in yields of that product will be asked by the government. Shortage of tank cars remains a serious matter. Michigan refiners report that they are unable to obtain enough crude to fill their requirements.

Mid-Continent refiners faced greater demand than they could supply, as they were asked to try to ship more to the East Coast district, while they were having difficulty in supplying regular customers in the Middle West.

Markets of the Western Pennsylvania refining district were featured by further recovery for neutral oils, with prices stiffening after having weakened recently. Some refiners still were offering neutrals at the lately depressed prices, but others were firmly quoting prices above those lows. Bright stocks continued closely held, and some plants were sold out of wax, while gasoline, kerosine, and fuel oil were extremely scarce.

Louisiana December Allowable Lowered

In the proration order issued by the Louisiana Conservation Department based on daily production of crude oil in December the allowable will be 312,399 barrels.

December allowable for North Louisiana is 85,019 barrels daily as compared to 88,067 barrels in November. For South Louisiana the daily allowable for December is 227,380 barrels compared with 233,904 barrels in November.

The Louisiana Conservation Department's allowable for November was 321,971 barrels.

Week's Figures Reflect Shortages of Fuel Oils

Continued difficulty in providing adequate quantities of heating oil and fuel oil was reflected in latest statistics of the industry, covering the week ended November 21, although there was some success in holding down unneeded production of gasoline, with the result that stocks of that product were reduced, in preparation for the commencement of national rationing. Some cause for concern in the meantime was the continued draft on the nation's stocks of crude oil, which came down another million barrels and within 6,000,000 barrels of the 20-year low that was reached in October, 1939, after Mid-Continent states shut down for two weeks and precipitated a temporary shortage.

Crude runs to stills averaged 3,722,000 barrels daily in the week of November 21, and were 66,000 lower than in the previous week and 313,000 barrels (7.7 percent) lower than in the week ended November 22, 1942, when they averaged 4,035,000 barrels daily. At 3,722,000 barrels daily, the runs were employing 77.5 percent of rated capacity of the refineries of the nation. Appalachian and Middle Western plants processed less crude than in the previous week and used around 92 percent of capacity, and

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8– 5	3,650	10–21	278,607	5–26	87,769	4–22	39,562	10–28	116,237	8–26
1940	3,890	3–16	3,690	6–22	265,865	8–31	102,817	4–20	49,051	10–19	109,135	9–14
1941	4,337	11–22	[4]4,120	10–18	266,187	3–29	99,727	3–29	[5]54,983	11–15	102,448	1– 4
1942	[4]4,337	2– 7	3,961	1– 3	263,208	3–28	[1]107,229	3–14	49,861	11–14	95,857	1– 3
Lows:												
1939	[3]1,601	8–26	3,125	2–18	[2]229,127	10–21	71,152	10– 7	20,722	4–15	105,397	4– 8
1940	3,335	11–30	3,370	1– 6	237,339	1–27	79,847	11– 9	23,551	4– 6	102,344	2–10
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,381	4–12	90,914	7–12
1942	3,297	7– 4	3,393	5–23	235,262	11–14	78,583	11–21	29,240	4–25	76,903	7– 4
Trends in 1942 (Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29,240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,304	.....
July 25	3,691	.....	3,658	.....	249,262	.....	82,281	.....	35,966	.....	77,816	.....
August 29	3,964	.....	3,697	.....	249,007	.....	80,831	.....	42,060	.....	78,034	.....
September 26	3,909	.....	3,802	.....	242,785	.....	80,550	.....	45,945	.....	78,943	.....
October 31	3,901	.....	3,731	.....	239,266	.....	79,159	.....	48,131	.....	79,166	.....
November 7	3,838	.....	3,674	.....	236,198	.....	79,238	.....	49,034	.....	79,125	.....
November 14	3,880	.....	3,788	.....	235,262	.....	79,418	.....	49,861	.....	78,631	.....
Nov. 21, 1942	**3,912**	.....	**3,722**	.....	.....	.....	**78,583**	.....	**49,541**	.....	**77,779**	.....
Nov. 22, 1941	4,337	.....	4,035	.....	[4]240,399	.....	85,409	.....	55,649	.....	94,894	.....
Change												
In week	+32	.....	—66	.....	—936	.....	—835	.....	—320	.....	—852	.....
In year	—425	.....	—313	.....	—5,137	.....	—6,826	.....	—6,108	.....	—17,115	.....
In year	—9.7%	.....	—7.7%	.....	—2.1%	.....	—7.9%	.....	—10.9%	.....	—18.0%	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, November 15, 1941.

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels)

STATE OR DISTRICT	*State Allowable of Crude Production	PRODUCTION IN WEEK ENDED Nov. 21	Nov. 28
Arkansas	74,400	74,050	74,000
California	738,000	745,200	736,300
Long Beach		34,600	34,600
Midway-Sunset		55,500	55,900
Kettleman Hills		40,200	37,500
Wilmington		96,300	93,900
Rest of State		518,600	514,400
Colorado		6,500	6,500
Illinois		264,750	254,250
Salem		35,200	36,100
Louden		44,850	43,100
Other New Pools		172,800	156,850
Old Pools		11,900	18,200
Indiana		15,200	16,700
Kansas	302,000	311,550	299,100
Kentucky		11,900	12,300
Louisiana	309,800	324,550	325,100
North Louisiana		96,000	96,600
South Louisiana		228,550	228,500
Michigan	62,800	65,400	60,950
Mississippi		64,400	61,300
Missouri		130	130
Montana		22,450	21,650
Nebraska		3,250	3,200
New Mexico	94,600	96,500	96,500
New York		13,450	12,800
Ohio		9,350	9,650
Oklahoma	377,500	366,300	365,700
Oklahoma City		63,750	66,500
Seminole Area		85,250	84,450
Rest of State		217,300	214,750
Pennsylvania		49,050	49,650
Tennessee		30	30
Texas	1,340,723	1,377,100	1,381,000
Upper Gulf Coast		313,050	312,800
East Texas Field		354,650	355,200
Rest of Eastern Tex		95,900	96,100
Lower Gulf Coast		103,100	105,500
Southwest Texas		52,500	53,400
South Central Texas		17,800	18,200
West Texas		212,400	211,900
North Texas		137,750	137,800
Panhandle		89,950	90,100
Utah		15	15
West Virginia		9,100	9,800
Wyoming		91,950	93,650
Total 8 prorated States	3,299,823	3,360,650	3,338,650
Total United States	.....	3,922,175	3,890,275

* Details on state allowables in The Oil Weekly of Nov. 9, page 137.

refineries of the East Coast and Southwestern districts cut back a little and operated at 68 percent. Oklahoma-Kansas showed no material change in operating at 87 percent, and Rocky Mountains used 65 percent of plant capacity, nearly the same as the week before. California cut down 31,000 barrels daily to 690,000, and used 84 percent of capacity.

Refiners showed no great concern over the possibility of surplus gasoline after December 1 but on the contrary were apparently interested in having available sufficient gasoline to take care of the abnormal demand expected in the several days of unrestricted sales in the 31 hitherto unrationed states. Despite curtailed refinery runs of crude, there was 2000 barrels a day greater production of gasoline in the week of November 21 than in the previous week. The larger output significantly was mainly in the unrationed areas of the Southwest and in Oklahoma-Kansas-Missouri district.

The continued heavy production in those areas was justified, moreover, by large current demand, as attested by withdrawals of relatively large quantities of gasoline from storage. The nation's stocks of gasoline were reduced 835,000 barrels in the week of November 21, and that decline occurred in the face of an addition of 702,000 barrels to storage in California. The United States total of 78,583,000 barrels on hand at the end of the week was nearly 7,000,000 barrels (8 percent) less than that of 85,409,000 barrels reported as of November 22 last year.

After having reached a high of 49,861,000 barrels in preparation for the heavy consuming season, stocks of gas oil and distillate fuel began their fall-winter decline and in the week ended November 21 came down 320,000 barrels to 49,541,000. At that level they were 6,000,000 barrels (11 percent) under the total of 55,649,000 barrels reported November 22, 1941.

Continued serious trouble in supplying heavy fuel oil was indicated by withdrawal of 852,000 barrels from storage in the week of November 21, with all districts except Rocky Mountain and Oklahoma-Kansas reducing inventories. The 77,779,000 barrels on hand at the end of the week was 17,000,000 barrels or 18 percent less than the 94,894,000 barrels held a year earlier.

United States crude oil stocks totaled 235,262,000 barrels on November 14, the Bureau of Mines reported. They were off 936,000 barrels from a week before and about 5,000,000 barrels under the total of 240,399,000 as of November 15, 1941.

Louisiana Opposes Gas Line Construction

The Louisiana Public Service Commission has filed a petition with the Federal Power Commission asking to be allowed to intervene as an opponent to an application of the Tennessee Gas & Transmission Company, Inc., for permission to build a gas pipe line from southwest Louisiana gas fields to serve industries in Alabama and Tennessee.

The proposed pipe line would have an annual capacity of 110 billion cubic feet. War plants and industries in Alabama and Tennessee would be furnished gas for fuel and after the war the gas would be used for both industry and domestic needs, according to the application.

P. A. Frye, secretary of the Louisiana Public Service Commission signed the petition and declares that the state legislature has directed opposition against construction of any further pipe line to transport gas outside of the state.

The proposed pipe line would pass through Louisiana and Mississippi to Muscle Shoals, Alabama, and then to Brace, Tennessee, where branch lines would take the gas to Nashville and Knoxville.

Fields from which the proposed line would have a daily capacity of between 155 and 300 million cubic feet of gas, depending upon the number of compressor stations built, are: Abbeville, Lake Arthur, South Roanoke, South Jennings, China, South Elton, North Elton, Tepetate and North Tepetate in the southwest Louisiana area. These fields have an estimated gas reserve of a trillion cubic feet or about ten times the maximum annual capacity of the proposed line.

Plans have also been announced to seek Federal Power Commission approval for two other gas lines, one by Hope Engineering Company for a line from Louisiana to West Virginia and a line from Louisiana to New York by the Reserve Natural Gas Company. The latter line would cost $80,000,000. It is expected the state will also oppose these in view of the legislative mandate.

Louisiana Gas Line

Pipe is being laid for the Ville Platte-to-Alexandria gas line after Southern Gas Lines Incorporated, of Monroe, had application approved by the Army and Munitions Board and had the recommendation of the Eighth Army Service Command of San Antonio.

The line will be 42 miles long and 8-inch pipe. It will correct the possibility of a gas shortage in Alexandria and surrounding Army camps.

Canadian Operators Want Crude-Price Increase

An increase of 50 cents a barrel in the price of crude oil would swell Turner Valley oil revenue by $12,500 a day or $4,562,500 a year and only mean a boost in the present retail price of gasoline of 2½ cents a gallon, it is stated by Calgary oil men.

The Alberta oil industry is asking the Dominion oil controller to authorize a crude-oil-price increase as a means to encourage drilling of remaining locations in Turner Valley and the undertaking of more extensive wildcat operations in this province.

With Turner Valley oil production declining and only the search for new fields hampered by lack of finances, it is said additional revenue afforded by a price increase would help assure additional production at a time Canada urgently requires every drop of oil which can be produced in this country.

An additional revenue of $4,562,500 a year would permit the drilling of 25 new Turner Valley wells at $180,000 each or about 10 new test wells on shallow structures in Alberta.

It is recognized, of course, that only a portion of this new money would be devoted to drilling wells. All individual holders of royalties could not be expected to re-invest the additional sums due them in further oil development. But the increased returns would make further drilling most attractive from a financial standpoint and would, it is thought, precipitate a drilling boom.

Select Committee of Petroleum Safety Section

The executive committee of the petroleum section of the National Safety Council has been named following the annual meeting in Chicago, November 27, 28 and 29. As sectional leaders they will have responsibility for the current nationwide campaign, "Save Manpower for Warpower," the program for safety in all lines of industry.

Personnel of the executive committee and individual activities of each member follows:

General chairman, H. T. Markee, Phillips Petroleum Company, Bartlesville; vice chairman for production, J. L. Jones, Sun Oil Company, Dallas; vice chairman for marketing, J. J. Reilly, Tide Water Associated Oil Company, Boston; vice chairman for pipe lines, J. C. Askam, The Ohio Oil Company, Findlay; vice chairman for manufacturing, W. W. Weldon, Standard Oil Company of Louisiana, Baton Rouge; news letter editor, W. A. Allred, Lone Star Gas Company, Dallas; engineering committee chairman, Q. R. Dugan, Cities Service Oil Company, Bartlesville; health committee chairman; Dr. V. R. Frian, The Texas Company, Lawrenceville, Indiana; industrial data sheet committee chairman, J. L. Risinger, Socony-Vacuum Oil Company, New York.

The several vice chairmen make up the program committee.

The chairman of the publicity committee is John C. Ebel, Shell Oil Company, New York; chairman of the education committee is F. M. Russell, Standard Oil Company of California, San Francisco.

Chairmen of the several divisions are: Atlantic, Roy Bonsib, Standard Oil Company (N. J.), New York; Great Lakes, R. T. Henderson, Standard Oil Company of Ohio, Cleveland; Gulf Coast, Lee B. Conner, The Texas Company, Houston; Mid-Continent, D. A. Klemme, Stanolind Oil & Gas Company, Tulsa; New England, Carl J. Meiser, Sun Oil Company, Boston; Pacific Coast, W. E. Lovejoy, Standard Oil Company of California, San Francisco.

Past general chairmen of the petroleum division are: R. W. Black, Standard Oil Company (N. J.), Elizabeth, New Jersey; H. W. Boggess, Sinclair Prairie Oil Company, Tulsa; R. S. Bonsib, Standard Oil Company (N. J.), New York; A. W. Breeland, Lone Star Gas Company, Dallas.

36-Mile Natural Gas Line Placed in Service

Lea County Water Company, Hobbs, New Mexico, placed in service the past week a 36-mile 7-inch natural gas line that extends from the South Eunice field to the east border of Eddy County, where connection is made with the New Mexico Eastern Gas Company's system in the Roswell-Carlsbad district. The new line will also supply gas for repressuring plants in the Maljamar and Loco Hills fields.

U. S. Field Operations

Illinois Basin

Number of Operations Continue to Decline

Forty-eight new operations reported in the state during the week, a slump of 14 from the previous 7-day period; total operations were 301, a decline of 6. Slight show of oil recovered in Hamilton County wildcat. Extension to Gallatin County field being tested. Clay County wildcat finds oil show. Marion County wildcat abandoned after finding slight show.

Hamilton County: Mid-Continent Petroleum Corp.'s Rubbin 1, 22-3s-6e, 6 miles northeast of the Dahlgren pool near the Wayne-Hamilton County line, recovered a porous section at 3420-38 ft which carried a slight show of oil. Coring was being continued.

Gallatin County: W. H. Dickerson and D. G. Leiberknecht's Moye 1, NW SW NE 15-8s-9e, northeast outpost to a Cypress sand field 3½ miles northeast of Ridgway, was cleaning and testing.

Clay County: A drill-stem test was underway at K. M. Bayer's M. A. Allison 1, SE SE SE 25-3n-5e, a wildcat 3 miles northeast of Xenia. Saturation was found in sample cuttings of Aux Vases sand but depth of the prospective pay was not revealed.

Marion County: B. J. Taylor's Garrett 1, NE NE 24-4n-2e, a wildcat 4 miles west of Kinmundy which recovered a slight show of oil in Benoist sand at 2006 ft, has been abandoned at 2260 ft.

Clinton County: J. H. Ashoff's Huelsman 1, SE NE NE 20-1n-3w, a mile southeast of Bartelso, is on production test of Devonian lime at 2463-77 ft. The test was reopened recently following its abandonment after finding the Benoist sand dry a year ago.

Operations Summary: White County is the most active area in the state with 58 operations. Hamilton County led in new production last week when 8 wells were initialed at 2252 bbls a day. There were 39 successful completions, which had a total initial of 7228 bbls a day.

Kentucky

Henderson County: Basin Drilling Co.'s B. S. Dossett 1, SW NE 18-P-21, wildcat 4 miles south of Smith Mills pool, was abandoned at 2742 ft. Starting at surface elevation of 388 ft, Glen Dean was topped at 1999 ft.

Hopkins County: Continental Oil Co.'s Baker 1, NE SE 12-J-22, wildcat 10 miles southeast of Providence, set surface casing to 244 ft.

Union County: Sun Oil Co.'s Morgan-Davis, SE SE 20-P-19, was running in cable tools to test Waltersburg sand pay at 1805-23 ft. Holte is bottomed at 1823 ft.

Indiana

Posey County: Superior Oil Co.'s Carr 1, NW NE SW 29-4s-13w, new wildcat start 1½ miles northeast of New Harmony and 2 miles from other production, was drilling at 550 ft.

In Point Township, Roy Lee, Trustee's Dr. W. P. Dearing 1, NE NE NE 30-8s-14w, wildcat 2 miles south of production, was drilling at 2265 ft.

Results on Industry's Prospecting Fronts

Completion of 49 wildcat tests last week added 8 new oil fields to bring to 397 the total of such strikes through drilling of 2851 wildcat tests during the year.

Arkansas: Wildcat work is increasing.

Illinois: Work continues decline.

North Louisiana: Production extended.

California: Wildcat work active.

South Texas: Deep test planned.

East Texas: Nacogdoches test has Travis Peak show.

ILLINOIS FIELD COMPLETIONS

Clay County: Ohio's Poehler 1, nw se nw 4-5n-7e, abnd 2791 ft.

Ohio's Poehler 3, se ne nw 4-5n-7e, Weller 2500-21 ft, 100 bbls, 2521 ft.

Pure's Kluthe 2, nw ne se 4-5n-7e, Weller 2494-2515 ft, 101 bbls, 2515 ft.

Edwards County: Cities Service's Thread A-2, c e½ w½ nw 18-1s-11e, McC 3209-3216 ft, 66 bbls, 3228 ft.

Fayette County: H. Luttrell et al's Aukamp B-2, se sw se 30-5n-3e, abnd 1907 ft.

Carter's Wright 1, se nw ne 16-7n-3e, Cyp 1546-52 ft, 1554-59 ft, pb 1567 ft, 49 bbls, 1710 ft.

Franklin County: I. W. Taylor's Parrish 1, e½ w½ nw ne 19-5s-2e, abnd 2748 ft.

E. S. Adkins' CW&F Coal 5-E, ne ne se 35-6s-2e, TS 2088 ft, 157 bbls, 2151 ft.

Gallatin County: R. E. Martin's Todd 1, c e½ ne se 18-7s-11e, abnd 2898 ft.

Cherry & Kidd's Kerwin 4, nw ne sw 11-8s-10e, L Tar Spgs 2063 ft, 15 bbls, 2073 ft.

Hamilton County: Pure's Union Central 1, se se se 36-5s-6e, Cyp 2720-22 ft, pb 2802 ft, 294 bbls, 3035 ft.

Tide Water's Dennis 1, se se se 27-6s-5e, abnd 3276 ft.

Cameron's Wilson 4, c e½ nw ne 6-6s-7e, AV 3029-50 ft, Bethel 2930-50 ft, 75 bbls, 3062 ft.

Kingwood's Shelton 2, se sw ne 18-6s-7e, AV 3000-53 ft, 22 bbls, 3053 ft.

Shell's Morris-Shelton 2, se se nw 18-6s-7e, AV 2021-25 and 2027-53 ft, 30 bbls, 3069 ft.

Shell's Summers 3, se nw ne 18-6s-7e, AV 3003-17 and 3017-40 ft, 390 bbls, 3052 ft.

Jasper County: Pure's Resch Consol. 1, c ne nw 20-6n-10e, McC 2832-38 ft, 775 bbls, 2860 ft.

Pure's J. M. Swick 1, c ne sw 20-6n-10e, McC 2815-19 ft, Rosi 2791-97 ft, 760 bbls, 2840 ft.

Delta Oil Prod.'s W. J. Maginn 1, w½ sw sw 34-6n-10e, abnd 2905 ft.

Jefferson County: Walter Duncan's Crouch 1, c e½ sw sw 36-2s-4e, abnd 3177 ft.

Lawrence County: Sam Malias' Walker 2, n½ nw nw sw 26-2n-12w, Biehl 1343-69 ft, 100 bbls 16 hrs, 1374 ft.

Randolph County: Kingwood's Wilson 8, se ne se 6-6s-7w, AV 2994-3003 and 3008-20 ft, 10 bbls, 3036 ft.

Richland County: Sinclair-Wyoming's All States 9, s½ nw nw se 22-2n-11w, Bethel 1750-72 ft, 80 bbls, 1772 ft.

W. B. Parriot's Lehr 1, c nw ne 24-4n-11w, Bridgeport 790-94 ft, pb 797 ft, 150,000 gas, 1193 ft.

Wabash County: Horton & Wiggins' Carson 3, ne sw se 16-1s-12w, abnd 1996 ft.

L. E. Kennedy's Carson 5, sw sw se 16-1s-12w, Cyp 1978-94 ft, 28 bbls, 1997 ft.

Wayne County: Pure's Barth E-1, c ne nw 11-1n-7e, AV 2956-77 ft, 197 bbls, 3090 ft.

Carter's Dickey 1, c sw ne 20-1s-6e, abnd 3215 ft.

V. A. Thompson's Griffin 1, c ne se ne 8-1s-7e, AV 3139-48 ft, 25 bbls, 3162 ft.

Sohio's Hanna Sons 2, c w½ sw ne 31-1s-7e, abnd 3293 ft.

N. V. Duncan's Anderson 1, c nw sw 2-1s-8e, Rosi 3068-3078 ft, pb 3087 ft, 230 bbls, 3108 ft.

Texas Co.'s Holacher 1, sw ne se 33-2s-7e, abnd 3231 ft.

White County: Skelly's Fearn B-3, nw se sw 20-3s-14w, Biehl 1910-20 ft, pb 1918 ft, 50 bbls, 1920 ft.

Skelly's Fearn B-3, nw se sw 20-3s-14w, Biehl 1910-20 ft, pb 1918 ft, 50 bbls, 1920 ft.

B. R. Grey's Hutch 12, se sw nw 21-4s-14w, AV 2826-37 ft, 36 bbls, 2845 ft.

W. C. McBride's Grey 3, ne ne se 7-4s-10e, Tar Spgs 2453-76 ft, pb 2499 ft, 7 bbls, 2500 ft.

Magnolia's Jones Estate 3, nw se ne 7-4s-10e, Tar Spgs 2460-86 ft and 2496-2500 ft, 60 bbls, 2500 ft.

Magnolia's Sisson-Higgins 12, ne se se 24-6s-10e, Tar Spgs 2274-2301 ft, 28 bbls, 2303 ft.

Carter's Hamilton 9, se nw se 2-7s-8e, Bethel 2763-66 ft, 36 bbls, 2943 ft.

Sinclair-Wyoming's Lamb 1, ne se sw 2-

U. S. Drilling Operations in Week Ended November 28, 1942

STATE	ALL WELLS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	*Miscel.	Total 1942	Total this Date 1941	‡WILDCATS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	Distillate	Total 1942
Alabama						3	5						3
Arizona						2							2
Arkansas	1	1				123	179						19
California	20	18		2		713	1,060	2			2		107
Colorado						14	18						2
Florida						1	1						1
Georgia						2	1						2
Illinois	53	30	1	20	2	1,981	3,651	11	2		9		551
Indiana	7	3		4		351	500	1			1		89
Iowa							6						
Kansas	27	14	2	10	1	1,490	2,067	6			6		333
Kentucky	1	1				155	307						37
Louisiana	12	5	2	5		861	1,442	1			1		134
Michigan	13	1	2	10		632	794	5		1	4		169
Mississippi	1			1		97	192	1			1		39
Missouri						33	77						20
Montana	5	4	1			186	209	1			1		7
Nebraska						28	88						14
New Mexico	5	3		2		356	358						42
New York	30	19	1		10	1,137	982						1
Ohio	27	7	10	9	1	1,036	1,646						
Oklahoma	19	8	1	6	4	1,292	1,989	2	1		1		272
Pennsylvania	48	41	5	2		3,576	3,711						
Tennessee						8	22						5
Texas	54	31		22	1	4,900	9,637	18	4		14		992
Utah							3						
Virginia						1							
West Virginia	18	2	13	2	1	695	693						
Wyoming	7	6	1			95	123	1	1				10
Total this week	348	194	39	95	20	19,768	29,761	49	8	1	40		2,851
Total last week	341	196	35	99	11	19,420	29,138	45	7	1	37		2,802
Total this year	19,768	10,229	1,713	5,211	2,615			2,851	397	50	2,396	8	

* Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

7s-8e, Cyp 2624-48 ft, Bethel 2796-2818 ft, AV 2887-2934 ft, 89 bbls, 2934 ft.

ILLINOIS WILDCAT COMPLETIONS

Clay County—Failure: National Refining Co.'s LaRue 1, ne se sw 9-4n-8e, abnd 3115 ft.

Clinton County—Failure: W. B. Lagers' C. Rudolph 1, se nw nw 32-3n-3w, abnd 1054 ft.

A. B. Schiermann's Loux 1, se sw sw 5-3n-2w, abnd 890 ft.

Edwards County—New Field: Stanolind's Broster 1, se se ne 7-2s-10e, McC 3418-21 and 3440-44 ft, pump 35 bbls oil, 70 wtr, 3496 ft.

Gallatin County—New Field: Sinclair-Wyoming's Porter 1, sw nw ne 17-7s-9e, Benoist 2870-84 ft, pb 2890 ft, pump 25 bbls oil, 30 wtr, 3173 ft.

Livingston County—Failure: L. B. Hutchinson's A. F. Corbin 1, w½ ne ne ne 8-29n-5e, abnd 315 ft.

Madison County—Failure: Ledbetter & Gardenshire's Holtman 1, c ne se 20-4n-7w, abnd 2320 ft.

L. Sloan's Kisner 1, c nw sw sw 2-4n-6w, abnd 2619 ft.

Marion County—Failure: A. L. Williams' Feller 1, ne nw nw 24-4n-4e, abnd 2715 ft.

Richland County—Failure: Nadel & Gussman's G. McEvilly 1, c sw sw 12-3n-14w, abnd 3099 ft.

Washington County—Failure: C. V. Richardson's Weihe 1, se se nw 4-1s-2w, abnd 1501 ft.

ILLINOIS WELLS DEEPENED

Champaign County—Failure: Barber & Sievers' Lindsey 1, c nw se 20-20n-8e, otd 1777 ft, abnd 2054 ft.

Madison County — Failure: C. S. Beck's (Cherry & Kidd) Leef 1, ne nw se 5-5n-5w, otd 1981 ft, abnd 2731 ft.

ILLINOIS WILDCAT STARTS

Bond County: H. A. Hoffman's Wilson 3, sw ne ne 24-4n-3w, dr.

Coles County: W. L. Topf's Kinsel His 1, c se se sw 20-14n-10e, dr.

Cumberland County: Falcon-Seaboard Drlg. Co.'s M. McClain 1, c nw sw 12-9n-7e, lcn.

Madison County: C. G. Smith's Michael 1, sw nw se 11-3n-6w, lcn.

INDIANA FIELD COMPLETIONS

Daviess County: R. C. McClellan's Wm. & B. Quigley 1, nw se sw 5-2n-5w, abnd 670 ft.

Gibson County: Carroll Oil Co.'s Crecelius 2, nw nw se 36-1s-10w, Hardins 1316-22, 35 bbls, 1338 ft.

Continental's Maier 57, Sec. 6-3s-13w, Cyp 2475-99 ft, 170 bbls, 2500 ft.

W. C. McBride's Swonder 1-B, nw sw sw 3-4s-14w, abnd 3002 ft.

Spencer County: H. C. Detrick's J. E. Krausch 1, sw sw ne 33-6s-5w, abnd 1177 ft.

Vanderburg County: Sells Petroleum Co.'s McCarty Unit 3-A, e½ w½ ne nw 32-6s-11w, Walt 1778-1792 ft, 69 bbls, 1792 ft.

INDIANA WILDCAT COMPLETION

Owen County: Sun's Chambers 1, c e½ sw se 23-10n-5w, abnd 3199 ft.

KENTUCKY FIELD COMPLETION

Henderson County: Cherry & Kidd et al's Burbank 5, 24-Q-21, Cyp 2295 ft, 620 bbls, 2305 ft.

Oklahoma

Lincoln County Well Testing in Viola Lime

The Mid-Continent Petroleum Corp.'s Bonebrake 1, NW NE 32-17-5e, Lincoln County, which showed for gas in Skinner and continued on to Wilcox without further testing, is bailing down to check deeper zones with pipe set in Viola lime.

Oklahoma County: E. J. Kubat's Sanders 1, C NE NE 33-11-1e, which picked upon only a minor show in the first and second Wilcox sands at 6203 and 6305 ft, respectively, has plugged back from the lower zone to the intermediate Marshall section and will perforate where electric log indicated porosity.

Texas County: Cabot Carbon Co. has stretched out the Texas Panhandle-Hugoton, Kansas, gas reserve at Ennis 1, C E½ 4-2n-15ecm, which cleaned itself from the Herrington-Ft. Riley section at 2620-2740 ft, after treatment with 12,000 gallons of acid. Location is 2¼ miles southeast of production.

Hughes County: Burke-Greis Oil Co.'s Strickland 1, NW NE NE 19-7n-11e, is a wildcat location on the west flank of the McAlester Basin in eastern Hughes County. Well will test Wilcox sand whereas most tests drilled in this area have been to shallow zones with chief prospects being Cromwell, Atoka, Sonora and Gilcrease.

OKLAHOMA FIELD COMPLETIONS

Caddo County—Apache: Amerada's Hunter 3, c nw se 34-6n-12w, Top bromide 3617 ft, pay 3796 ft, flow 1852 bbls oil, 3990 ft.

Carter County—W. Hewitt: Dixon & Lawson's Woodsworth 10, sw ne nw 20-4s-2w, broken lime and sd 2125-2202 ft, pay 2165-2200 ft, pb 2200 ft, pump 5 bbls, 2385 ft.

Garfield County—Garfield: Sinclair-Prairie's Crews 1-C, c sw se 19-22n-3w, Crews 1955-77 ft, pb 2025 ft, shot 30 qts 1960-77 ft, pump 20 bbls, 2195 ft.

Hughes County—Unnamed: J. H. Grimes' Barnes 1, se sw se 24-8n-10e, Gilcrease 2813 ft, pay 2815-30 ft, pb 2830 ft, 1,200,000 gas, 2863 ft.

Logan County—Langston: Eason et al's Smith 3, sw ne nw 13-17n-1w, Misener 4908 ft, Wilcox 5147 ft, perf in Misener, 3000 gals acid, pump 48 bbls, 5180 ft.

Noble County—Liberty: Deep Rock's Schultz 1-B, nw nw ne 16-22n-2e, 2nd Wx 4529 ft, abnd 4545 ft.

Okfuskee County — Weleetka: Bryant & Moffett's Bean 2, c nw ne 22-11n-11e, Gilcrease 2401-23 ft, abnd 2435 ft.

Oklahoma County—NE Edmond: Harper-Turner's Harper 10, c ne se 17-14n-2w, Bartlesville 5804 ft, shot 80 qts 5830-50 ft, flow 23 bbls, 5861 ft.

Okmulgee County—S. Beggs: Murta & Wilson's Thompson 1-A, c nw nw 36-15n-11e, Wx 2838-53 ft, abnd 2865 ft.

Osage County—S. Hominy: Oklahoma Power & Water Co.'s Osage 143, nw se sw 30-22n-9e, sand 438-54 ft, pump 25 bbls, 454 ft.

Osage County—Quapaw: R. C. Cemeshire's Osage 1, sw se se 22-25n-11e, pink lime 1584 ft, abnd 1875 ft.

Pawnee County—Garr: Hall Brisco's Moebibs 1, c sw nw 33-20n-5e, Misener 3668 ft, pump 25 bbls, 3881 ft.

Pawnee County—Hallett: Johnson Oil & Refg. Co.'s Turner 1, c nw se 10-20n-7e, Wx 2957 ft, abnd 2979 ft.

OLD WELLS DEEPENED

Creek County—Depew: Shell's Byrd 1, ne nw nw 15-15n-8e, otd 3220 ft, Wx 3796 ft, shot 40 qts 3796-3823 ft, pump 50 bbls, 3826 ft.

Noble County—Otoe City: Superior's Faubion 2, ne sw se 16-22n-1e, otd 4731 ft, Avant 2970 ft, pb 4121 ft, 2000 gals acid, 8,700,000 gas, rock pressure 1180 lbs, 4815 ft.

Oklahoma County—Oklahoma City: British-American's Hays-Highland 1, c e½ ne se 22-12n-3w, otd 6592 ft, Wx 6391 ft, shot 300 qts 6570-6632 ft, pump 381 bbls, 6632 ft.

Osage County—Naval Reserve: Kay County Gas Co.'s Osage 7-B, nw sw ne 22-24n-7e, otd 2600 ft, Miss 2570 ft, 5,400,000 gas, rock pressure 800 lbs, 2614 ft.

OKLAHOMA WILDCAT COMPLETIONS

Lincoln County — Failure: Creekmore-Ronney's Southers 1, c nw se 33-16n-5e, Ccb 2621 ft, Osw 3303 ft, Miss 3953 ft, Wood 4159 ft, Hunton 4181 ft, Syl 4207 ft, Dense 4319 ft, Dolo 4337 ft, Sdy dolo 4348 ft, abnd 4376 ft.

Noble County—New Field: Deep Rock's Dailey 1, se nw ne 10-22n-2e, Dewey 2495 ft, Perry 2526 ft, Miss 4055 ft, Wood 4267 ft, Viola 4299 ft, Dolo 4317 ft, Wx 4345 ft, Wx 4369-71 ft, flow 1085 bbls, 4371 ft.

OKLAHOMA WILDCAT STARTS

Cimarron County: Pure's Cox 1, se sw se 16-5n-8ecm, lcn.

Stephens County: Coline Oil Co.'s Ford 1, c ne se 24-1n-6w, lcn.

Kingrey Bros.' Ketchum 1, c ne sw 3-1n-9w, rur.

Kansas

Barton County New Pool Opener Tests 408 Barrels

Black & Marshall's Hitschman 1, C SW SE 32-16-11w, Barton County, in the irregularly productive area of the Kraft-Prusa sector, is being treated after an initial test of Arbuckle did not show for the anticipated response.

Nate Appleman et al's Deal 1, C SL SE SW 6-16-12w, Barton County, recent pool opener, has obtained potential of 408 bbls, flowing after plugback to Lansing-Kansas City from Arbuckle. Upper section perforated at 3127-3130 ft.

Barber County: Olsen Oil Co.'s Axline 1, C NE NE 16-13-11w, a wildcat 3 mi ne of Whelan, drilled into Mississippi chat at 4506 ft, showed oil and is drilling.

Nemaha County: Clifton, Gall and Towle's Mills 1, C SE NE 24-1s-14e, wildcat, is abandoned. Log shows Topeka at 880 ft, Lansing 1278 ft and Hunton at 2891 ft. This off-trend location was near Ridge, and more geologically associated with Nebraska play than Kansas.

McPherson County: Vickers Petroleum Co.'s Bean Estate 1, C W½ SE SW 25-17-4w, in the newly opened Bean area, has showed good saturation in Simpson sand at 3536-3542 ft, with best shows, in the lower 4 ft. Previously, the well showed for Viola production, the field's other horizon.

KANSAS FIELD COMPLETIONS

Cowley County — Gibson: Sinclair-Prairie's Shurtz 3, nw sw ne 29-34s-3e, Bartlesville 3340 ft, pump 73 bbls, 3381 ft.

Ellis County—Bemis: Cities Service's Johansen B-1, c e½ ne nw 34-11s-17w, Arb 3592 ft, 3000 gals acid, 3000 bbls, 3598 ft.

Graham County—Morel: Barnsdall's Davignon 2, c se sw 11-9s-21w, Arb 3709 ft, abnd 3787 ft.

Cities Service's Sutor A-1, nw ne se 22-9s-21w, Arb 3798 ft, pay 3803-05 ft, 2000 gals acid, 3000 bbls, 3805 ft.

Greenwood County—Quincy: Ed Ashlock's Dinus 1, nw se sw 31-24s-13e, Cattleman 1480 ft, pay 1480-91 ft, pb 1498 ft, shot 40 qts, pump 50 bbls oil, 1 wtr, 1690 ft.

Haskell County—Hugoton: United Prod.'s Ponceti 1, nw nw se 19-29s-34w, lime 2532 ft, 1,500,000 gas, 2735 ft.

Leavenworth County—McLouth: B. W. McKnabe's Kessinger 1, c nw sw 1-10s-20e, McLouth 1381 ft, 724,000 gas, 1386 ft.

Mossbacker's Bell Estate 2, sw nw sw 6-10s-21e, Miss 1430 ft, abnd 1438 ft.

Leavenworth County — Linwood: Miller's Floyd Mills 1, c sw se 30-11s-22e, abnd 675 ft.

Marion County—Lost Springs: Kuhn Bros.' Holob 1, c se se 32-17s-4e, Miss 2395 ft, pump 168 bbls, 2417 ft.

McPherson County—Lindsborg: Dickey Oil Co.'s Rundberg 2, c w½ sw ne 19-17s-3w, Viola 3362 ft, 2000 gals acid, pump 42 bbls, 3370 ft.

Dickey's Rundberg 3, c w½ ne ne 19-17s-3w, Viola 3363 ft, 2000 gals acid, pump 40 bbls, 3367 ft.

Reno County — Peace Creek: Sinclair-Prairie's Baughman 3, sw se ne 1-23s-10w, Viola 3707 ft, 3000 gals acid, pump 28 bbls 8 hrs, 3743 ft.

Rooks County—Laton: Vickers' Reese 2, c nw se 3-9s-16w, Lansing 3091 ft, 6000 gals acid, pump 179 bbls, 3163 ft.

Russell County—Fairport: C. E. Liggett's Chrisler 2, c sw sw 9-11s-15w, Arb 3411 ft, abnd 3443 ft.

Russell County—Trapp: Coralena's Holland 4, c n½ nw sw 16-15s-13w, Lansing 3032 ft, pay 3065-90 ft, 1000 gals acid, pump 48 bbls oil 24 hrs, 3090 ft.

B & R Drlg.'s Tittle 1, c s½ se se 14-15s-14w, Arb 3361 ft, 1000 gals acid, pump 28 bbls oil 15% wtr, 8 hrs, 3371 ft.

Phillips et al's Maier 3, c se ne 15-15s-14w, Arb 3269 ft, pump 74 bbls, 3278 ft.

Sumner County—N. Vernon: E. B. Shawver's Chandler 1, c sw se 4-35s-2e, Miss Chat 3413 ft, swab 20 bbls oil 30 bbls wtr, 3493 ft.

E. B. Shawver's Waggoner 1, c nw nw 16-35s-2e, Chat 3328 ft, pump 20 bbls oil, 3380 ft.

OLD WELL DEEPENED

Stafford County—Zenith: Stanolind's Sims 2, c n½ nw ne 11-24s-11w, otd 3726 ft, Misener 3716 ft, Viola 3727 ft, 3000 gals acid, 3000 bbls oil 2% wtr, 3783 ft.

KANSAS WILDCAT COMPLETIONS

Cowley County — Failure: Zephyr Drlg's Stout 1, nw nw sw 20-33s-5e, Topeka 1240 ft, Stalnaker 1965 ft, Layton 2393 ft, KC 2550 ft, Ft. Scott 2784 ft, Bart 3093 ft, Miss 3156 ft, B. Miss 3538 ft, Arb 3596 ft, abnd 3619 ft.

Marion County—Failure: Wolf Creek Oil Co.'s Mehl 1, ne sw sw 5-20s-5e, Lans 1725 ft, Base KC 2080 ft, Miss 2230 ft, Base Miss 2300 ft, Viola 2518 ft, hfw, abnd 2544 ft.

McPherson County—Failure: Derby and E. K. Carey's Johnson 1, c s½ sw se 35-17s-2w, Lans 2132 ft, Miss 2825 ft, Base Miss 3042 ft, Hunton 3135 ft, Maquoketa 3183 ft, Viola 3266 ft, Simp shale 3331 ft, Arb 3392 ft, abnd 3416 ft.

Nemaha County—Failure: Clifton Gall & Tolle's Mills 1, c se ne 24-1s-14e, Topeka 880 ft, Lans 1277 ft, Hunton 2890 ft, abnd 2946 ft.

Stafford County—Failure: Herndon Drlg. Co.'s Suiter 1, sw se nw 9-25s-15w, Anhy 980 ft, Topeka 3170 ft, Lans 3817 ft, Congl 4218 ft, Viola 4313 ft, Simp 4456 ft, Arb 4536 ft, abnd 4566 ft.

Wallace County—Failure: Sinclair-Prairie's Wallace Investment 1-A, sw sw sw 23-11s-39w, abnd.

KANSAS WILDCAT STARTS

Barton County: Palmer Oil Corp. and Mid-

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Continent's Harrison 1, nw nw ne 18-20s-13w, lcn.

Decatur County: Stanolind's C. H. Hale 1, se se se 32-2s-26w, lcn.

Ellis County: Darby's Huber 1, c w½ ne sw 31-12s-20w, lcn.

McPherson County: Skow Bros.' Toll 1, se se se 34-17s-4w, lcn.

Saline County: Adkins Oil's Andrews 1, ne nw nw 8-16s-1w, rig.

Deep Rock Oil Corp.'s Hunton 1, ne nw sw 20-16s-1w, rig.

Stafford County: Herndon Drlg.'s Lynn 1, se se nw 12-21s-11w, rig.

NEW MEXICO FIELD COMPLETIONS

Eddy County: Texas Trading Co.'s Grier 1, c sw sw 29-16s-31e, flow 150 bbls, 2-in, shot 80 qts 3254-84 ft, td 3298 ft.

Western Prod. Co.'s Keely 4-C, c nw se 23-17s-29e, flow 223 bbls, 9/16-in, acid 3500 gals 3015-67 ft, td 3165 ft.

Williams & Ployhar's Harbold 3, 35-17s-27e, abnd 505 ft.

Lea County — Maljamar: Maljamar O&G Corp.'s Mitchell 11-A, c se nw 19-17s-32e, flow 100 bbls, 2-in, shot 180 qts 3560-3650 ft, td 3794 ft.

NEW MEXICO WILDCAT COMPLETION

Roosevelt County—Failure: W. J. Peterman et al's Wilmes 1, 340 ft from s and 1980 ft from e lines 21-2s-30e, elev 4561 ft, Yates zone 2274-2361 ft, abnd 3454 ft.

West Central Texas

Jones County Well Makes Good Flow

Brown County wildcat showing for small gasser, Coleman County gas area yields unusually large producer. Wimberly field records prolific well on north edge. Pipe line connections to be given Reddin and Markel pools.

Brown County: Central Texas Gas Co.-J. B. Whitesides' Kirkpatrick 1, near center John Greenwood Survey 155 and 8 miles southwest of Brownwood, opened a new pool with 250,000 to 500,000 ft flow gas, acidized 4000 gallons in Marble Falls at 1287-1450 ft, total depth 1458 ft.

Coleman County: Lone Star Gas Co.'s Duggins 1, Mary A. Fisk Survey and within the Thrifty pool, rated 100,000,000 ft dry sweet gas daily to become largest in district. Production from Marble Falls at 2134-96 ft, and zone was treated with 4000 gals of acid. Cornelius Kroll and Ellis Bahney's Starnes 1, GH&H 2, Blk 1, 5 miles southeast of Coleman, promises to open an oil pool. Estimated 15-bbl pumper after 30-quart nitro shot 2000-18 ft.

Jones County: Ernest L. Wilson et al's Mashburn 2, north edge of Wimberly pool, responded to acid treatment of Hope lime at 2278-2301 ft with flow of 150 bbls in 3 hours, open tubing, then 31.93 bbls in 30 minutes, ¾-in choke.

Pipe Lines: Onyx Refining Company is building a 4-in pipeline extension from its Wimberly pool system to tap the Reddin and Merkel pools, Taylor County, where operators have been absorbing tank trucking charges in marketing their allowable.

WEST CENTRAL TEXAS FIELD COMPLETIONS

Comanche County: J. C. Hamer et al's Smith 4, BBB&C 31, pump 22 bbls, sand 734-53 ft.

Taylor County—Reddin: Butler-Horne Dr. Co.-Geochemical Surveys' Reddin 1-A, elev 1779 ft, flow 250 bbls, ¾-in, lime 2262-65 ft.

Jones County: Fain-McGaha Oil Corp.'s Church 1-B, 705 ft from s and 330 ft from e lines blk 84, DeWitt CSL, flow 317 bbls ¾-in, acid 2500 gals 2525-31 ft, td 2537 ft.

Shackelford County: Roeser-Pendleton & Conoco's Cook 3-A-112, E. T. Ry. sec 112, abnd 1689 ft.

Taylor County — View: Tal-Vez Oil Co.'s Braune 1, 370 ft from n and 800 ft from e lines blk 13, Guadalupe CSL sur, elev 1929 ft, abnd 2507 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Callahan County—Failure: O. L. Wylie et al's Taylor 1, 700 ft from w and 350 ft from n lines se Blind Asylum Lands 67, abnd 406 ft.

Jones County—Failure: Merry Bros. & Perini's Maxcey 1, 139 ft from s and 330 ft from w lines of 100-ac tr in se part T&P 4, blk 16, elev 1708 ft, abnd 2197 ft.

Callahan County—Oil Discovery: Anderson-Prichard Oil Corp.'s Sealy-Smith 1, sw ne nw GH&H 121, blk 2, 4½ mi ne Coker pool, elev 1971 ft, pump 88 bbls oil, plus 39 percent water, Morris sand 3051½-55 ft, td 3064 ft.

Taylor County—Reddin Pool Deeper Pay: Butler-Horne drlg. Co.-Geochemical Surveys' Frazier 1, 330 ft out sec T&P 26, blk 17, elev 1778 ft, flow 725 bbls oil, plus 10 percent water, natural, ¾-in, Hope lime 2442-46 ft.

WEST CENTRAL TEXAS WILDCAT STARTS

Callahan County: B. A. Duffy et al's T. A. Irvin 1, 660 ft out nec sec 349, Geo. W. Denton sur, lcn.

Palo Pinto County: H. R. Montgomery et al's H. H. Johnson 1, 2560 ft from sw and 330 ft from nw lines Bennett McNelly sur A-329, lcn 5000-ft test.

Jones County: Fain-McGaha Oil Corp.-S. C. Herring's Petty 1, 330 ft out NWc 29, leag 124, Grimes CSL sur, lcn for Swastika test.

West Texas

North Cowden Lease Deal Requires Drilling

Continuous drilling required in lease deal on east edge of the North Cowden field. Bay Petroleum Co. on its initial development program.

Ector County: Stanolind Oil & Gas Co. has acquired a lease on the east halves of Sections 45 and 46 and northeast of Section 47, T-1-N, situated immediately east of North Cowden field. Deal involves payment of from $79 to $130 per acre out of production, and development of the acreage. Stanolind has pooled some of the acreage along with that held by Arrow Drilling Company unitized operations.

Wildcats: Humble's Newman 1, Scurry County, was drilling at 8080 ft in hard chert, topped at 8042 ft in Swisher County, Helms et al's Harris 1 was drilling at 5370 ft on 5500-ft contract, but may continue to below 7000 ft. Shell's Blue 1, eastern Winkler County, was drilling lime at 7530 ft.

Reagan County: Amerada's University 1-R-I, ¼ mile south of most westerly producer in Barnhart pool, logged base of black shale at 9058 ft, 15 ft low, and is running pipe after drilling through pay to 9287 ft. First Ellenburger pay was at 9125-42 ft, and top of main saturation at 9175 ft, elevation 2776 ft. Company's University 1-R-H, ¼ mile east, was flowing into pits to clean itself before acidizing Ellenburger perforations at 9105-74 ft.

Cochran County: Four adjacent 190.6-acre labors in Scurry County School Lands, League 53, southwest portion of Slaughter field, have been assigned by Humble Oil & Refining Co. to Bay Petroleum Corp., new entrant in the district. Immediate development is to follow on this farmout, with Humble retaining ⅛ over-ride and deep production rights. Humble has also farmed out a portion of its 7950-acre Annie Armstrong lease immediately east of its 7 flowing wells on the east edge of the Wasson field to DeKalb Agricultural Association, which is starting initial test C SE SW Sec 889 and on 360-acre lease.

Gaines County: Shell's Leaverton 1, 4 miles sw of Wasson field, was coring Clear Fork zone at 7080 ft, having cored and used tester at close intervals the past 1200 ft. Drill-stem test at 6735-6860 ft yielded 16½ bbls of oil- and gas-cut rotary mud, with formation samples showing 10 to 20 percent porosity.

Crane County: Magnolia's Tucker 1, ¼ mile northeast of its McKee pool discovery, was drilling limy-shale at 6070 ft, having topped Tulip Creek at 5915 ft, elevation 2452 ft, 54 ft low. Gulf's Dawson 1-A, 4½ miles west of McCamey field, was drilling at 4360 ft, and Estes 1, 3 miles west of Sand Hills field, drilling at 3050 ft. Both are to drill to Ellenburger. Gulf is starting a third deep prospect in Pecos County, and is due to become most active wildcatter in district in near future.

Pecos County: Phillips Petroleum Co.'s Price 1, initial try for Ordovician production in southeast part of county, was drilling Lower Permian shale at 7260 ft. Company has acquired extensive acreage between Fort Stockton and this prospect, including an almost solid block of about 29,500 acres, centering upon Blocks 133, 134, 135, 136 and 137, T. & St. L. Ry. Surveys. Purchases were made after geophysical surveys.

WEST TEXAS FIELD COMPLETIONS

Andrews County — Embar-Tubb: Phillips' University-Andrews 22, c sw sw sec 20, blk 10, elev 3246 ft, flow 259 bbls 41.3-gr, ¼-in, acid 1000 gals Clear Fork (Tubb), perf 6240-80 ft, td 6325 ft.

Andrews County—Embar-Ellenburger: Phillips' University-Andrews 21, c ne ne sec 35, blk 11, elev 3270 ft, Ellenburger 8395 ft, abnd 8425 ft.

Andrews County—Emma: Sinclair Prairie's Cowden 19, 3129 ft from n and 1913 ft from e lines T&P 1, blk 44, T-2-N, flow 870 bbls, 2-in, acid 5000 gals 4151-4241 ft.

Cochran County—Slaughter: Continental's Dean 10-58, 3347 ft from e and 651 ft from n lines lse, leag 58, Martin CSL, flow 811 bbls, 3-in, acid 12,000 gals 4920-67 ft.

Jerry Hawkins et al's Mallet 1-A, 580 ft from s and 510 ft from w lines lab 25, leag 47, Edwards CSL, flow 822 bbls cas, acid 11,500 gals 4930-80 ft.

Jerry Hawkins et al's Mallet 21-A, 580 ft from s and 510 ft from w lines lab 16, leag 47, Edwards CSL, flow 742 bbls cas, acid 11,500 gals 4924-78 ft.

T. P. Coal & Oil Co.'s Mallet 2, 510 ft out nec lab 2, leag 53, Scurry CSL, pump 222 bbls, 3% water, acid 10,000 gals, shot 140 qts 5000-53 ft.

Crockett County — World-Powell: G. M. Smith et al's Powell 1-E, 660 ft from s 330 ft from w lines BS&F 6, blk A, pump 159 bbls, 15% water, acid 500 gals 2656-69 ft.

Pecos County—Abell: Magnolia's Erickson-State 3, c lot 2, H&GN 26, blk 9, abnd 3973 ft.

Pecos County—Walker: Cardinal Oil Co.'s University 5-B, 1788 ft from n and 3398 ft from w lines sec 24, blk 16, flow 52 bbls 1-in, shot 60 qts 2092-2104 ft, td 2120 ft.

Cardinal Oil Co.'s University 2-E, 2402 ft from s and 2220 ft from w lines sec 13, blk 16, flow 72 bbls 1-in, shot 50 qts 2098-2108 ft.

Upton County—McCamey: Trebol Oil Co.'s Ricker-Humble 4, 1650 ft from nw and 2641 ft from ne lines sec 5, blk R, M. S. Denton sur, flow 264 bbls, plus 34% water, ½-in, natural, 2116-2210 ft.

Ward County—South Magnolia-Sealy: Atlantic & Standard of Texas' University 1-B, near c ne sw sec 12, blk 16, flow 389 bbls, ¼-in, natural, 2907-11 ft.

Yoakum County—Wasson: American Liberty's Lynn 2, c sw sw sec 733, flow 173 bbls, 2-in, gas lift, acid 10,000 gals 5070-5169 ft.

WEST TEXAS WILDCAT STARTS

Pecos County: Gulf's Rooney-Mercantile Co. 1, 700 ft from n and 620 ft from w lines CCSD&RGNG 82 sur, blk OW, lcn 8500-ft Ellenburger test.

Scurry County: W. S. Guthrie et al's Wren-Standard 1, c nw nw H&TC 292, blk 97, lcn 4000-ft test.

North Texas

New Pay Discoveries In Jack and Throckmorton

Clay County wildcat yields small show after initial acid treatment. Failure between K-M-A and Griffin-Kadane field. Forestburg area has four wells in process of completion. Final gauges given Montague County pool opener and new pay discoveries in Jack and Throckmorton counties.

Clay County: Youngblood & Foree's Sanzenbacher-Gulf 1, 4½ miles south-

west of Henrietta is showing a small amount oil and gas with 175 pounds closed casing pressure after acidizing through perforations in Mississippian saturation at 5994-6045 ft. Further acid treatments may make small well.

Archer County: Whitaker Oil Co.'s Frey 1, midway between K-M-A and Griffin-Kadane areas, yielded salt water in Strawn then abandoned in deepening to 4411 ft.

Montague County: Magnolia's Medley 1, west edge of Forestburg pool, rated at 50 to 75 bbls daily after acidizing Marble Falls at 7226-7444 ft, having plugged back from 7476 ft. Sinclair Prairie's Stedham 1, northwest outpost, indicated commercial producer in swabbing down for acid treatment of broken pay at 7160-7204 ft. Company's Jones 5 is preparing to test Marble Falls pay at 7179-99 ft, with 5½-in set at 7163 ft, and Jones 6 was awaiting drill-stem test in broken porosity at 711-7218 ft.

Discoveries: Two counties accounted for new pay discoveries while Montague County gained a new pool. The latter involves R. C. Lipscomb et al's Vaughn-Harmon 1, 2¼ miles northwest of Illinois Bend, pumping 150 bbls initial from Strawn perforations at 3855-65 ft.

In Throckmorton County, Humble's Mathews 1, situated within a shallow-oil area, pumped 85 bbls of oil and 109 bbls of water, having acidized Mississippi at 4597-4611 ft, total depth 4613 ft.

Initial try for deep production in Bryson field, Jack County, barely qualified as a producer when Hill & Hill's Clayton 5-B pumped 20 bbls of oil and 50 bbls of water after acidizing perforations in Marble Falls saturation at 4654-71 ft.

NORTH TEXAS FIELD COMPLETIONS

Archer County: Burma Pet. Co.'s Lemmons 2, sec 3, Meade Pasture subdiv, abnd 1312 ft.
Clay County: H. T. Merrill et al's Magnolia 1, sec 48, Parker CSL sur, A-374, abnd 850 ft.
W. H. Metzner et al's Taylor-Riley 1, 1350 ft from se and 330 ft from sw lines sec 35, Jane Duncan sur A-112, abnd 1190 ft.
Clay County—Watson: Roy Lee, Tr.'s Conrady 2, 785 ft from s and 1678 ft from e lines J. H. Fisher sur, Bend 5234 ft, flow 132 bbls, 5/16-in, acid 3000 gals, Bend perf 5398-5410 ft, td 5553 ft.

NORTH TEXAS OLD WELL DEEPENED

Cooke County: F. W. Merrick, Inc.'s Otto 5, 558 ft from s and 1501 ft from w lines 35-ac lse, blk 5, Geo. Ivy sur, otd 1244 ft, pump 5 bbls 1498-1502 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County—Failure: Bridwell Oil Co.'s Buerger 1, 1032 ft from n and 1110 ft from w lines sec 121, J. W. Harris subdiv, Gunsight 1372-74 ft, abnd 1386 ft.
Collin County—Failure: Dewey Miller et al's Manning 1, 1500 ft from n and 660 ft from w lines of Wm. Aiken sur, Austin chalk 710 ft, Georgetown 2076 ft, abnd 3010 ft.
Montague County—Oil Discovery: R. C. Lipscomb et al's Harmon-Vaughn 1, 660 ft out NEc W. C. Winters sur A-842, 2¼ mi nw Illinois Bend, elev 745 ft, Ellenburger 4918 ft, pump 150 bbls, natural, Strawn perf 3855-65 ft, td 4982 ft.
Throckmorton County — Deeper Bay Discovery: Humble's Matthews 1, 572 ft from n and 1931 ft from e lines Alvin Tarter sur A-824, top Bend 4168 ft, Mississippi 4570 ft, pump 85 bbls oil and 109 bbls water, acid 3000 gals Mississippi 4597-4611 ft, td 4613 ft.
Young County — Knox Pool Deeper Pay: Mudge Oil Co.'s Harrison 10, 510 ft from n and 1000 ft from w lines TE&L 3407, Mississippi 4746 ft, flow 1184 bbls, 7/16-in, Mississippi 4764-70 ft.

NORTH TEXAS WELL DEEPENED

Jack County—Bryson Field Deep Pay Discovery: Hill & Hill's Clayton Bros. 5-B, 1717 ft from s and 226 ft from w of e 70 ac of w 300 ac of n 404.85 ac of 715¼ ac tr in Lewis Knight sur A-324, otd (Strawn producer) 3123 ft, Bend 4198 ft, Marble Falls 4645 ft, Mississippi 5105 ft, Ellenburger 5371 ft, pump 20 bbls oil and 50 bbls water, acid Marble Falls perf 4654-71 ft, td 5435 ft.

NORTH TEXAS WILDCAT STARTS

Clay County: Roy Lee, Tr.'s J. W. Maddox-Shell 1, 330 ft out SEc w½ north 250-ac of

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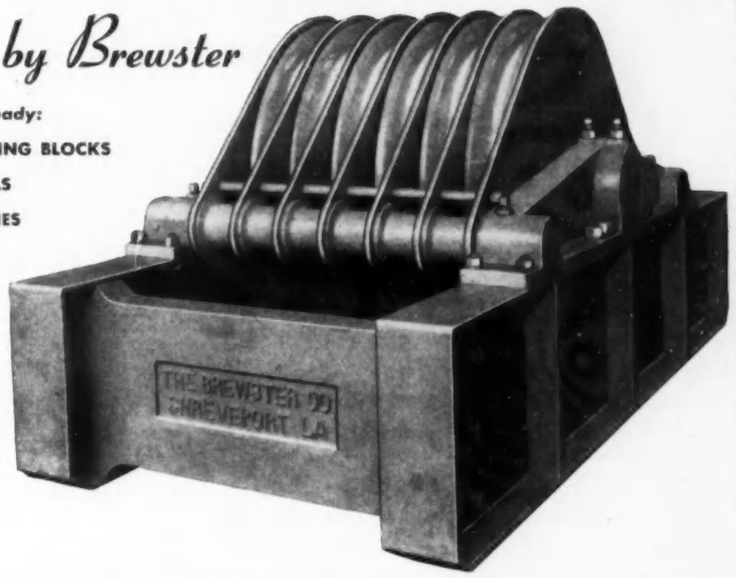

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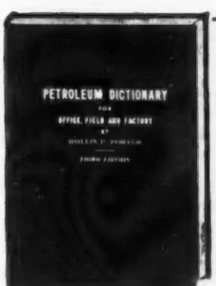

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T. M. Hughes sur A-179, lcn for 5700-ft Ellenburger.

Jack County: Hanlon & Buchanan's Hensley 1-A, 1485 ft w thence 495 ft n of NWc M. L. Franks sur A-1612, but in B. F. Terry sur A-611, 8 mi se Jacksboro, lcn 6000-ft test.

Shell's Wolfe 1, 330 ft from s and 481 ft from e lines TE&L 3341, 3½ mi se Jermyn, lcn 5650-ft test.

J. S. Youngblood and R. L. Foree's Clayton 1, 4393 ft from n and 1980 ft from e lines W. P. Kinkenon sur A-325, 6 mi sw Perrin, lcn 5700-ft test.

Young County: Roy Lee, Tr.'s W. J. Baze 1, 330 ft out NWc TE&L 354, 3 mi nw New Castle, lcn 5000-ft test.

TEXAS PANHANDLE FIELD COMPLETIONS

Carson County: J. M. Huber Corp.'s Burnett 14-R, 2205 ft from e and 765 ft from s lines I&GN 111, blk 5, pump 70 bbls, granite-wash 3072-3125 ft.

Skelly's Schafer 162, 2200 ft from s and 440 ft from w lines I&GN 189, blk 3, pump 153 bbls, shot 570 qts 3050-3167 ft.

Gray County: Wilcox O&G Co.'s Worley-Reynolds 41, 2970 ft from s and 330 ft from e lines I&GN 61, blk 3, pump 93 bbls, granite-wash 3058-69 ft, td 3102 ft.

East Texas

Nacogdoches County Test Shows Travis Peak Prospects

Wood County's indicated oil discovery is exploring Paluxy zone before running pipe for completion. Nearby prospect encountered water in Woodbine. Nacogdoches County wildcat shows production possibilities in Travis Peak. Gathering system to be installed in Coke field.

Wood County: Delta Drilling Co. and Rube Benton's Goldsmith-Shell 1, 2½ miles northwest of Quitman, was coring at 6490 ft to explore the Paluxy section before running pipe for completion. This wildcat previously indicated oil production, based upon recovery of 30 to 50 ft of oil-saturated sand, topped at 6258 ft, before reaching the water level. Top of Paluxy was called at 6253 ft, elevation 485 ft. This pending strike involves same type of structure as the Coke field, situated 7¾ miles northeast.

Magnolia's McCreight 1, projected Travis Peak test and 3½ miles northwest of the above Wood County prospect, was drilling at 4580 ft with water in Woodbine, topped at 4458 ft, elevation 423 ft, estimated 115 ft low. Logged base of Austin chalk 4015 ft, or 47 ft low.

New Wildcats: Van Zandt County has been assigned two Paluxy tests, including A. F. Carter and T. F. Morrow's Hazel 1, H. C. Morris Survey, mile north of Fruitvale. O. W. Killam's Wages 1, Daniel Chesser Survey, 6 miles southwest of Canton, will explore a structure outlined by Woodbine failures. The Sand Flat area, Smith County, will be tested by C. L. Wickliffe and W. L. Patrick's Hackett-Pure 1, Sam Leeper Survey, with depth contract calling for water in Travis Peak, or 9200 ft.

Nacogdoches County: The Texas Co.'s Strahan 1, M. J. Ariola Sur and 7 miles northeast of Nacogdoches, revived its production outlook from Travis Peak in developing show of gas after drilling soft section at 8985-88 ft, and was due to core ahead in fulfilling 9000-ft depth contract. This wildcat is credited with passing up gas at 8640-55 ft in Travis Peak, topped at 8615 ft, elevation 447 ft.

Henderson County: Delta Drilling Co. and Lone Star Gasoline Co.'s Gentry-Sinco 1, 3 miles southwest of Athens, without shows and abandoned in Travis Peak at 8685-8704 ft. Bobby Manziel et al's Levine 1-B, third test this year on the Trinidad prospect, found water in Woodbine and abandoned near 3900-ft level.

Smackover Projects: P. D. Bowlen and Grady Vaughn's Simms 1, Bowie County, drilling at 7790 ft and near base of Cotton Valley, topped at 7060 ft. In Ellis County, J. B. Stoddard et al's Smith-Texaco 1, mile west of Alma, was drilling at 2460 ft.

Coke Field: Amerada is to install a gathering system in this area to facilitate handling of the output of its 16 wells in making tank car deliveries to a refinery in Illinois. Amerada's French 1, west outpost, flowed 50 bbls initial on ½-in from Paluxy perforations at 6370-77 ft. Oil tests 20.4-gr as compared to 24-27 average for field. Amerada's Yates 1, southeast extension, flowed 3 bbls of oil hourly while cleaning itself, with production from perforations at 6346-57 ft, and is starting McCreight 2, 990 ft north of most northerly producer.

Cass County—Kildare: The Texas Co. completed Benefield-Singleton 1, Wanhop Survey, with initial flow of 948 bbls of 40.2-gr from 5993-6002 ft, using 5/16-in choke. Gas-oil ratio 527/1.

Panola County — Carthage: Flow of 6,000,000 ft from lower Pettit has been squeezed at 4940-58 ft, in Feazel's Burnett 1, Mallory Survey. This test will be a dual completion and flow from Hill sand in upper Rodessa is 60,000,000 ft per day from perforations at 4919-30 ft, rock pressure 2250 pounds. Upper Pettit will be tested in Burnett 1 for gas-distillate production between 4900-5700 ft. Southwest of Burnett 1, Feazel's Burnett 2, Hill Survey, will test two sands encountered in the upper Pettit.

Harrison County—Waskom: Finaled for the last operation presently in the Waskom area, Arkansas Louisiana Gas Co.'s Abney 1, Wilson Survey, flowed 17,000,000 ft of gas per day with spray of distillate from perforations at 5924-6228 ft, rock pressure 2400 pounds, total depth 6395 ft.

EAST TEXAS FIELD COMPLETION

Wood County—Coke: Amerada's French 1, 3210 ft from e and 6790 ft from s lines of M. Y'Barbo sur, elev 528 ft, top Paluxy 6358 ft, flow 50 bbls 20.4-gr oil, ½-in, Paluxy perf 6370-77 ft, td 6398 ft.

EAST TEXAS WILDCAT COMPLETION

Henderson County—Failure: Delta Drlg. Co.-Lone Star Gas Co.'s Gentry-Sinco 1, 660 ft w of m/e/e and 660 ft n of m/n/n point on s line of 566.6-ac lse, C. M. Walters sur, 3 mi sw Athens, elev 383 ft, top Georgetown 5040 ft, Paluxy 6261 ft, Massive anhydrite 7726-7887 ft, Travis Peak 8685 ft, abnd 8704 ft.

EAST TEXAS WILDCAT STARTS

Limestone County: Peyton Bros. et al's Thompson 1, 665 ft from ne and 750 ft from nw lines 65-ac lse, Pedro Varela sur, mim for Woodbine test.

Smith County: C. L. Wickliffe & W. L. Patrick's O. Hackett-Pure 1, 800 ft from s and center e and w lines of 51-ac tr, Samuel Leeper sur, Sand Flat prospect, rur for 9200-ft Travis Peak test.

Van Zandt County: O. W. Killam et al's G. A. Wages 1, 660 ft from s and 990 ft from e lines 175-ac tr, Dan. Chesser sur, lcn for Paluxy test.

Southwest Texas

Jackson County Deep Sand to Be Tested

Work still active in Jackson County. Garcia field extended northwest. Caldwell County wildcat to test.

Jackson County: John B. Coffee is preparing to test a new deep sand at West Mauritz in Mauritz Bros. 3-B. Hole is bottomed at 5850 ft with 5½-in casing set for perforations in new section. This level is below regular field sand and is southeast of production. Perforations will be made in 5600-ft sand. The well is in M. L. York survey 22.

Wildcat: Humble Oil & Refining Co. has resumed work in San Antonio Joint Stock 1, 8500-ft wildcat 5 miles southwest of Edna, Jackson County. The well was spudded June 29, and surface pipe was set but crew moved off to another area. Location is in Carlos Lasso survey.

The OIL WEEKLY'S TRADING POST

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Trading Post Section, THE OIL WEEKLY
P. O. Box 2608 Houston, Texas

Caldwell County: John A. Deering has set pipe to make flow test in Union Central Life 1, wildcat 4 miles southwest of Lockhart, after finding shows in Austin chalk and Edwards lime. Chalk was topped at 2008 ft, lime at 2385 ft.

Refugio County: Gulf Oil Corp. is continuing tests on Tatton 2, wildcat mile east of Copano Creek field and 3 miles southeast of Tomoconnor field in Mrs. Essey Reed survey, A-251. Perforations were made at 8460-80 ft in deep portion of Frio. Hole is bottomed at 8680 ft with 7-in casing set at 8480 ft. Sands were reported at 8473-85 ft and 8308-28 ft.

Victoria County: Union Producing Co. is testing Rudolph 1, wildcat northwest of previous gas and distillate production at North McFaddin. First perforations were made at 5400 ft after setting 5½-in pipe to 5470 ft. Total depth is 5892 ft. A drill-stem test was made at 5370 ft before pipe was set to test.

Wilson County: Superior Oil Corp. and Progress Petroleum Co. are testing Gross 1, Poth area, on pump after Midway sand was acidized at 4262-76 ft. Total depth is 4324 ft, plugged back to 4280 ft for testing. Pipe is set to 4260 ft.

Starr County: Sun Oil Co. has completed a major extension to Garcia field with Frost National 2-B flowing 153 bbls through 9/64-in choke from sand cored at 3743-54 ft. With hole bottomed at 3754 ft, 5½-in casing was set at 3752 ft for the test.

LOWER TEXAS COAST FIELD COMPLETIONS

Bee County — South Caesar: Continental's Fox 3, 1807 ft fr nl & 467 ft fr wl Charles Amsler sur, 6-in 6617 ft, perf 6612-15 ft, 138 bbls, ¼-in, td 6617 ft.

Jackson County—Maurbro: Humble's Gayle 5, 467 ft fr nel & 1010 ft fr nwl 360-ac tr, Abraham Clare sur, 5½-in 5218 ft, perf 5212-14 ft, 574 bbls, ¼-in, td 5218 ft.

Jackson County—Mayo: Texas Co.'s Tunison 5, 1125 ft w alg sl fr se cor Morris & Cummings sur 9, 5½-in 5587 ft, perf 5412-24 ft, 111 bbls, ¼-in, td 5600 ft.

Jim Wells County—Seeligson: Sun's Canales 16, 660 ft fr nl & 3155 ft fr el Canales-Dickson sur 180, 5½-in 5987 ft, perf 5193-95 ft, 129 bbls, 7/64-in, td 6002 ft.

Kleberg County—East Stratton: Humble's King Ranch-Paso Ancho 19, 660 ft e fr wl of 1350-ac tr, 5½-in 6576 ft, sand 6579 ft, flow 119 bbls, ¼-in, td 6604 ft.

Nueces County—Agua Dulce: Windsor Oil Co.'s Pyle 1, sec 84, sand 6815 ft, perf 6828-34 ft, 98 bbls, 7/64-in, td 6933 ft.

Richardson Petroleum's Union Central 2, 510 ft fr wl & 810 ft fr sl ne¼ sec 304, Palo Alto gr, 5½-in 5889 ft, 139 bbls, ¼-in, td 7200 ft.

LOWER TEXAS COAST WILDCAT COMPLETIONS

Cameron County—Failure: Standard (Texas) and Shell's Fredericks 1, San Benito area, 44-ac lse, blk 1, Concepcion de Carricitos gr, abnd 9102 ft.

Jackson County — Failure: W. Stewart Boyle's Heard 1, 40-ac Humble farmout, 2⅛-mi ne Ganado field, Francis Menefee sur, A-51, abnd 6008 ft.

Jackson County: Roxie Wright's Lancaster 1, 660 ft fr ne & sel's 87-ac lse, Francis Menefee sur, lcn abnd.

LOWER TEXAS COAST WILDCAT STARTS

Jim Wells County: Kirkwood & Morgan and John G. Mayo's Cummins 1, Magnolia City area, blk 5, Jose Pacheco sur, lcn 6000-ft test.

Karnes County: American Liberty's Roeder 1, Burnell area, 204-ac lse, J. Johnson sur, lcn 7500-ft Wilcox test.

SOUTHWEST TEXAS FIELD COMPLETIONS

Duval County—Garza: Highland Oil Co.'s Garza 1-B, 330 ft fr nl & 467 ft fr el sw sw BSF 524, abnd 3315 ft.

Starr County—Rincon: Humble's San Antonio Loan 3, 1980 ft fr nl & 660 ft fr el CCSD&RGNG 504, 664-ac tr, 5½-in 3999 ft, perf 3854-66 ft, 9/64-in, 76 bbls, td 4285 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Duval County—Failure: Henderson Coquat's Southland 5-C, 660 ft fr n&el's of se sec 4, Santos Flores gr, abnd 5081 ft.

Jim Hogg County—Failure: H. B. Zachery Co.'s Evers 1, Colorado field area, 1980 ft fr nel & 660 ft fr sel sur 8, abnd 2622 ft.

LaSalle County—Failure: Magnolia's Burks 1, Fort Ewell area, 330 ft fr sl & 2446 ft fr el Antonio Herrera sur 263, abnd 6202 ft.

LaSalle County—Failure: L. V. Manry's Talbert 1, 10 mi s Los Angeles, 640-ac tr, IGN 149, abnd 5616 ft.

Live Oak County—Failure: Moore Development Co.'s Doebbler 2, 200-ac lse, sec 76, Simmons City area, abnd 2519 ft.

SOUTHWEST TEXAS WILDCAT STARTS

Live Oak County: Continental's West 1, Oakville area, 875 ft fr sw & 990 ft fr nwl lot 65, 894-ac lse, Michael Caronican sur, lcn 3500-ft test.

Webb County: O. W. Killam's Bruni Est. 1, 1280-ac tr, sur 455, lcn 4000-ft test.

Webb County: H. H. Weinert and A. B. Bauchman's Guerra 1, Kohler area, 80-ac lse, sur 146, lcn 2750-ft test.

SOUTH CENTRAL TEXAS WILDCAT STARTS

Atascosa County: J. A. Hardcastle's Bowen 1, Pleasanton area, 660 ft fr n&el 262-ac lse, William Moore sur, lcn 2500-ft test.

Wilson County: Rowan & Hope's Sanders 1, tr 5, J. L. Sanders subdvn, Lavernia area, lcn 1100-ft test.

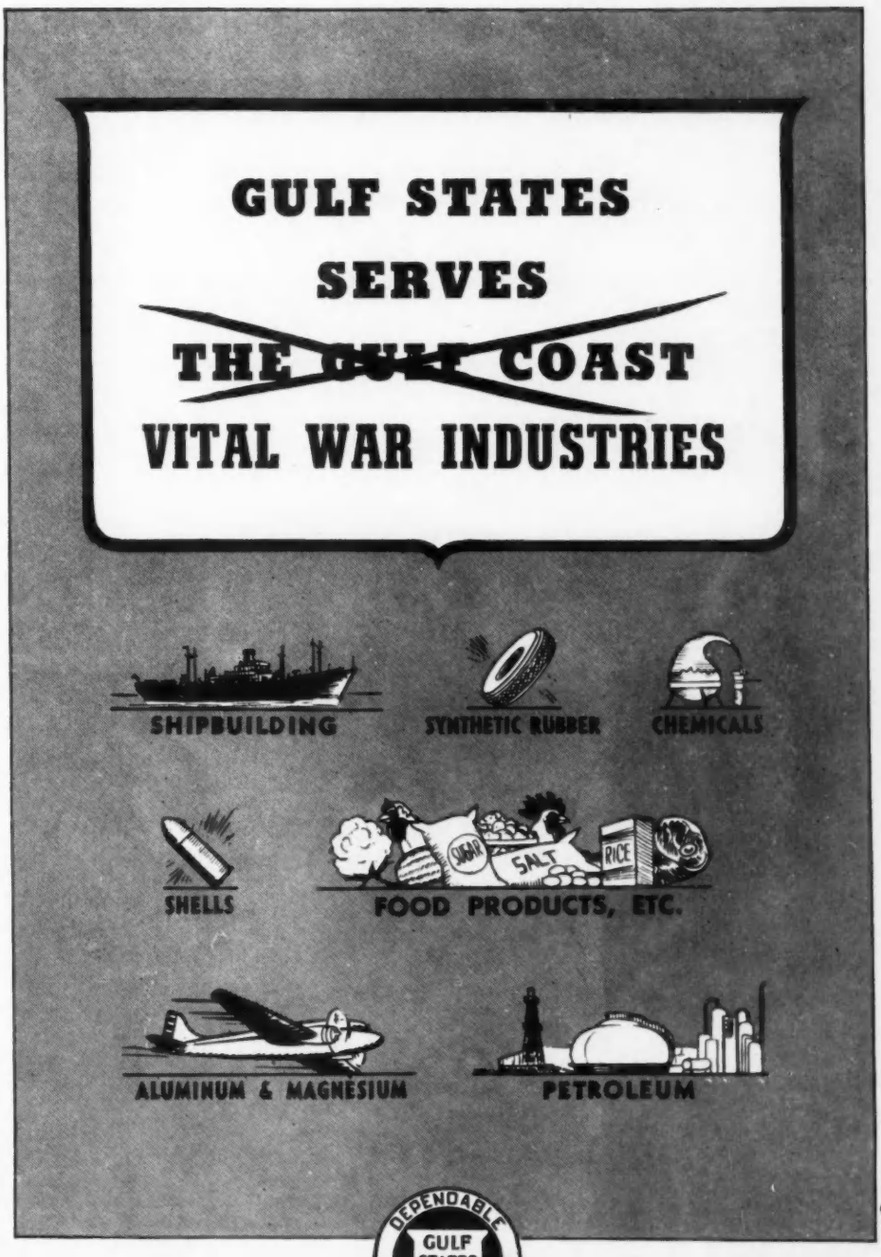
Texas Gulf Coast

Three Wildcat Wells Preparing to Drill

Three wildcat wells preparing to drill. Brazoria County well at deep level.

Wildcats: Humble Oil & Refining Co. has staked McFaddin Trust 1-C, wildcat in Salt Bayou area 10 miles southwest of Port Arthur in Jefferson County. The well is in I. D. Polk survey on 1209-acre tract. Projected depth is 10,500 ft with operations due to start soon. It will be a deep Frio test.

Pan American Production is preparing to drill Babcock 1, wildcat in North



General Offices—Beaumont, Texas, and Baton Rouge and Lake Charles, Louisiana

Louise area and 3200 ft northeast of company's Ekvall 1, recently abandoned. The hole is projected to 5800 ft with operators due to start immediately. This well is in Wharton County on 40-acre tract in S. P. Middleton survey.

Vee Tipt Oil Co., Houston, is preparing to start drilling Stewart 1, 6 miles southwest of College Station, Brazos County. Located on 417-acre tract in Stephen Jones League.

Brazoria County: Humble is drilling below 11,654 ft in Houston Farms 1-B, wildcat in Halls Bayou area. Although details have not been released, a few showings are reported to have been encountered in this deep wildcat.

Wilcox Test: H. B. Jordan, Tr., is running electrical survey to 6523 ft, total depth, in Texas Long Leaf 1, wildcat in Hortense area, Polk County, after failing to pick up any commercial shows in Wilcox topped at 5470 ft. Salt water was found in the Wilcox. The well is located in I. B. Thomas survey.

TEXAS GULF COAST FIELD COMPLETIONS

Hardin County—Sour Lake: H. R. Smith and Carpenter Production's Hebert & Ebberts 1, 42-ac tr, lot 68, Stephen Jackson sur, abnd 3797 ft.

Liberty County—Esperson: General Crude's Welch 2, 956-ac tr, M. Duncan sur, 1 mi s prodn, abnd 9776 ft.

TEXAS GULF COAST WILDCAT COMPLETIONS

Colorado County—Failure: Boyce & Smiser's Carpenter 1, West Garwood area, 74-ac lse, William Paulding sur, abnd 5991 ft.

Walker County — Failure: C. L. Tissue's Gibbs Bros. 1, 2509-ac tr, John Fox sur, A-200, 7 mi s Huntsville, abnd 7510 ft.

TEXAS GULF COAST WILDCAT STARTS

Galveston County: Glenn H. McCarthy's Stewart 1, 2000-ac block, James Spillman Lge, e Hitchcock field, lcn deep test.

Harris County: McDannald Oil Co.'s Fee 1, Splendora area, 80-ac tr, Victor Blanco sur, lcn 4500-ft test.

Jefferson County: Humble's McFaddin Trust 1-C, Salt Bayou area, 1209-ac tr, I. D. Polk sur, A-801, lcn 10,500-ft test.

Wharton County: Pan American's Babcock 1, North Louise area, 345-ac tr, S. P. Middleton sur, lcn 5800-ft test.

Louisiana Gulf Coast

Relief Well Started to Kill Producer at Branch

Second hole drilled to kill wild well in Branch area, Acadia Parish. Second well at Bayou Couba still testing.

Acadia Parish: Union Sulphur Co. has spudded its second well in Branch area after the discovery producer is still flowing approximately 1550 barrels of distillate daily and operators have been unable to control the flow. The second well is Gueno Estate 2, 1020 ft north of Gueno Estate 1. The discovery, 51-8s-2e, is flowing through 2-in outlets on 4-in flow lines through several separators. Previously the well flowed at rate of 2440 barrels daily through same outlets. The wildcat blew wild and burned several days from 10,447 ft. The second well will be drilled directionally to kill the discovery.

St. Charles Parish: Gulf is continuing tests in Delta Securities 2, second well in Bayou Couba area in 13-15s-21e, ½ mile north of Delta Securities 1 discovery. Perforations were made at 6218-34 ft after drilling to 6449 ft. Top of cement is 6247 ft. The well is credited with sufficient shows to make a producer.

East Baton Rouge Parish: Sugarfield Oil Co. is completing Lerver-Victory 1, outpost at University field, in sand at 6772-75 ft flowing clean oil through 7/64-in choke. This test was drilled to 10,160 ft but failed to produce from deeper horizons. It was then plugged back for the present completion. Location is in section 46-7s-1e.

Lafayette Parish: Stanolind is waiting on cement to set after running casing to make flow test in Niskerson 2, on north flank Anse la Butte dome. The hole is bottomed at 9200 ft in hard shale. Location is in section 43-9s-5e.

Calcasieu Parish: Union is testing in perforations at 4908-14 ft in a new sand for Vinton dome. Well is Grav 3-G in 33-10s-12w. Total depth is 5360 ft in sidetracked hole.

SOUTH LOUISIANA FIELD COMPLETIONS

Iberville Parish—Bayou Blue: Navarro's Wilberts 1-B, 1680 ft e, 330 s nw cor 75-9s-10e, abnd 6323 ft.

Lafourche Parish—Chacahoula: Sun's Levert 1, 1000 ft n, 1654 w sec 58-15s-15e, abnd 8026 ft.

Lafourche Parish—Golden Meadow: Texas Co.'s LLE-Golden Meadow 25, 17,820 ft w, 1980 n sec 78 in 75-19s-21e, abnd 3000 ft.

Plaquemines Parish—Garden Island: Texas Co.'s State-Garden Island 58, lse 214, sec 108-23s-32e, 7-in 5786 ft, perf 5675-5750 ft, 90 bbls, ¼-in, td 5751 ft.

St. Charles Parish—Paradis: Humble's Manufacturers Record 7, 40-14s-20e, 7-in 10,350 ft, perf 10,130-40 ft, 519 bbls, 3/16-in, td 10,350 ft.

St. Mary Parish—West Cote Blanche Bay: Texas Co.'s State 14, lse 340, in Bay T-15s-7e, perf 8550-60 ft, 227 bbls, 10/64-in, td 10,463 ft.

West Baton Rouge Parish—Bayou Choctaw: Carter's Morley Cypress 4, 330 ft n, 424 e swc 28-8s-11e, 6-in 7523 ft, abnd 7523 ft.

St. Charles Parish—Paradis: Texas Co.'s Sunset Realty 7, 3237 ft s, 5155 e ne cor

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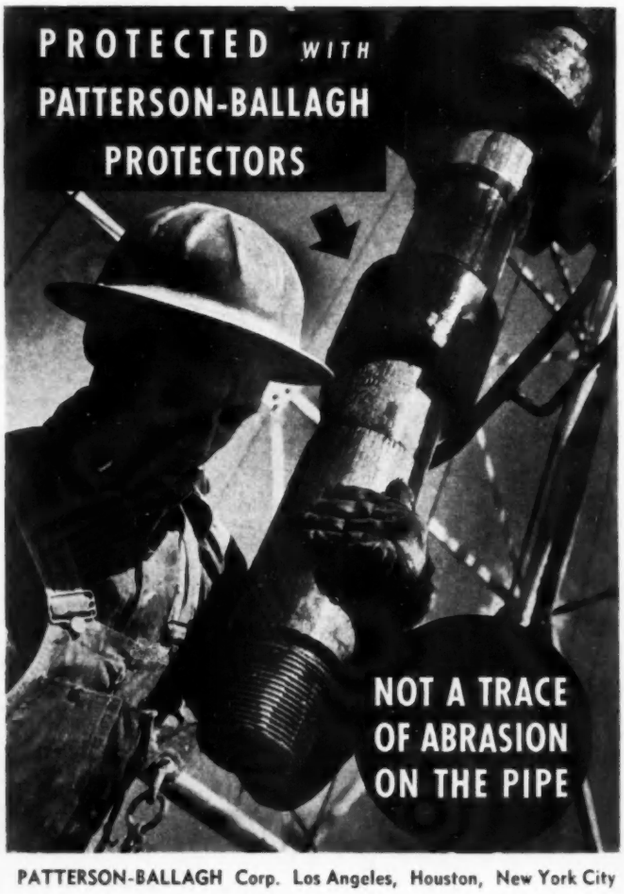

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frac sec 8 in 38-14s-20e, 7-in 10,400 ft, perf 10,362-80 ft, 189 bbls, ¼-in, td 10,400 ft.

SOUTH LOUISIANA WILDCAT COMPLETION

Orleans Parish—Failure: W. T. Burton's State-Lake Ponchartrain 8, lse 318, 7150 ft w, 1730 s Point au Herbes Lighthouse in lake, T-10s-13e, 7-in 8282 ft, abnd 9891 ft.

SOUTH LOUISIANA WILDCAT STARTS

Cameron Parish: Jack W. Frazier's Sweet Lake Land & Oil 1, ne Sweetlake field, sec 12-12s-7w, Stanolind farmout, lcn.

Lafourche Parish: Atlantic's Allen Land 1, north Golden Meadow, 1980 ft e, 495 n swc 49-19s-22e.

St. Charles Parish: L. J. Roussell's Ellington 1, Boutte area, 1357 ft n, 3940 e swc 119-13s-20e, lcn.

North Louisiana

Little Creek Extended Into Grant Parish

Waskom east flank prospect testing. Wilcox pumpers extend Little Creek area into Grant Parish. Natchitoches wildcat deepening. One Claiborne Parish wildcat preparing for production, another sidetracks equipment near projected depth.

Caddo Parish: Pettit horizon formations at base of Glen Rose recovered mud, gas and slight show of oil in Roy Fisher's Scott Unit 1, 474 S and 1300 E 8-16n-16w, drill-stem test at 5690-5750 ft. Operators will test Gloyd lime in upper Glen Rose. Hole drilled to 6305 ft. A series of favorable sands were encountered at 4990-5025 ft.

Scott Unit 1 is 4 miles northeast of Bethany field proper near Greenwood, southeast of Waskom, Texas.

Grant Parish: Placid Oil Co.'s Tremont B-1, C NE SW 10-9n-1e, Tremont B-2, C SW NW, same section and Tremont B-3, C SE NE 9-9n-1e are on the pump for 20 bbls from shallow Wilcox at 1490 ft. Placid abandoned Tremont B-4, C SW SW 10-9n-1e. The three pumpers extend Little Creek production into northeast Grant Parish.

Natchitoches Parish: George H. Echols is deepening Goodpine 1, C NE NE 13-13n-8w. Goodpine 1 was temporarily abandoned when early tests recovered only salt water at 5520 ft.

Claiborne Parish: Big West's Stewart Unit 1, 2626 S and 1320 W of NEC 3-21-4w, drilled to 5303 ft, is indicated for distillate production from the Pettit and is making production tests from that horizon. Stewart Unit 1 is 2 miles northeast of Lisbon field.

In Lisbon field Big West's Rudasill 1, 1320 S and 1328 W NEC 34-21n-5w, is making production tests from Pettit zone. Rudasill 1 drilled to 8762 ft.

Three miles south of Homer, Gulf's Miller 1, C NE NE 14-20n-8w, is nearing projected 9000 ft after sidetracking equipment lost when hole went crooked at 8250 ft. Miller 1 drilled through Pettit lime near 7000 ft, encountering no porosity at that horizon.

NORTH LOUISIANA FIELD COMPLETIONS

Claiborne Parish: Stacy's Smith 1, c sw sw 4-23n-8w, flow 28 bbls, ¼-in, tp 400, perf 5438-5504, td 5547 ft.

Morehouse Parish—Monroe: Southern Carbon Co.'s Tensas Delta 43, 11-21n-4e, flow 6,646,000 gas, rp 750, td 2200 ft.

Union Parish—Monroe: Farrell's State 38, 30-20n-4e, flow 3,099,000 gas, rp 315, td 2125 ft.

NORTH LOUISIANA WILDCAT STARTS

Morehouse Parish: Merren's Bonner 1, c nw nw 23-22n-7e, lcn.

Union Parish: Hunt's Frost 1, c se ne 18-23n-1e, lcn.

United Carbon Co.'s Frost 10, se 14-22n-3e, lcn.

Arkansas

Wildcat Activity Shows Increase

Hunt Oil Co. has spudded Kirk 1, C NW SE 33-12s-20w, Nevada County. Berry's fee 1, C SW SE NE 5-14s-20w, drilled to 1171 ft, is pumping 30 bbls from perforations at 1159-63 ft. Rig is up to drill Hunt's Stamps Land 1, C NW NW 35-14s-23w.

Hempstead County: West of the Nevada County activities Barnsdall Oil Co. abandoned Schultz 1, C SW NE 20-14s-25w; no shows reported when test bottomed at 6100 ft. Travis Peak marker was called at 3840 ft.

Calhoun County: Skelly Oil Co. has abandoned Calion 1, C NE SE 27-15s-14w at 4980 ft. It encountered dead oil in Smackover at 4923 ft, and cores at 4925-59 ft showed lime and dead oil. Seven miles east of Skelly's failure, Placid Oil Co. is below 3590 ft testing Freeman-Smith 1, C NE SE 24-15s-13w. Placid will drill Freeman-Smith 2, C NW NW 12-15s-14w, three miles northeast of Skelly's abandoned test.

Bradley County: Placid Oil Co.'s Murphy 1, C NE SE 3-16s-10w, Murphy 2, C SE SE 28-15s-10w and Murphy 3, C SW SW 16-17s-10w, three prospects below 4200 ft nearing Smackover lime objective at 4800 ft in this area.

Union County: Wheless' Union 1 is abandoned in C SW NW 11-18s-12w. Sand in Cotton Valley series had slight show at 5786 ft. Hole bottomed at 6286 ft in dry lime.

Miller County — Fouke: Carter Oil Co.'s Sturgis 11, C SE NW NE 1-17s-27w, is below surface casing and Carter's Sturgis E-1, C NW NE NW 11-17s-27w, is on the pump after pressure failed to rise above 10 pounds on tubing and casing pressure gauged only 100 pounds. Operators swabbed 33 bbls clean oil per hr from Sturgis sand perforations at 3614-20 ft. Sturgis E-1 drilled to 3801 ft.

ARKANSAS FIELD COMPLETION

Lafayette County — Midway: Southwood's Hodnett 4, c se nw 18-15s-23w, flow 130 bbls, ¼-in, td 6420 ft.

ARKANSAS WILDCAT STARTS

Union County: Carter's Morris 1, c nw nw 12-19s-15w, lcn.

Marwick's Madden 1, nw sw nw 3-18s-15w, lcn.

Columbia County: Roy Lee's Pickler 1, c sw ne 23-17s-21w, dr.

Southwood's Medlock 1, c se ne 12-16s-19w, dr.

Navarro's Beene 1, c se sw frac 10-20s-20w, lcn.

MISSISSIPPI WILDCAT COMPLETION

Madison County—Flora Area: Love's Anderson 1, c ne nw 12-8n-1w, elev 271, Sparta 843 ft, Wilcox 1965 ft, Clayton 4346, gas rock 4412 ft, abnd 4417 ft.

MISSISSIPPI WILDCAT START

Lincoln County: Freeport Sulphur Co.'s Board of Supervisors 1, c se se 16-5n-9e, dr.

ALABAMA WILDCAT STARTS

Fayette County: Thomason & Sheppard's Harbin 1, nw sw 3-16s-12w, fish.

Walker County: Superior Oil Co.'s Moss & McCormack 1, sw se ne 14-14s-9w, dr.

FLORIDA WILDCAT STARTS

Dade County: Consumer's State 1, c nw¼ 24-54s-35e, lcn.

Dixie County: Florida's Putman 1, ne¼ 7-11s-12e, sd.

Wakulla County: Lloyd Brown's Phillips' 1, nw nw 14-3s-1e, sd.

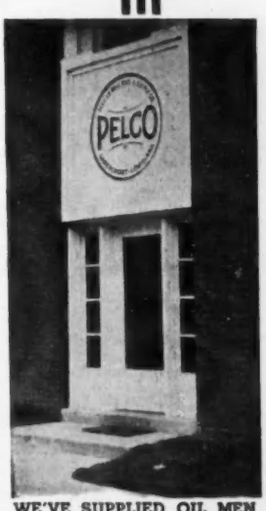
Walton County: Sanford & Arrington's Walton 1, c sw¼ 16-1n-18w, sd.

GEORGIA WILDCAT START

Coffee County: Taylor's Mattie Kight 1, 800 e and 400 n of sw cor of land lot 327, 6th land district, dr.

Same Ocean Different Boats

In this country we are not, thank God, in complete agreement — all in the same boat. Same ocean, maybe. An ocean of trouble. But we'd best continue to paddle our own canoes. Let's not make a mirage of the thing for which we fight. Harking back to how we relished what Stalin and Willkie and the columnists and commentators were saying just before we invaded Africa — not to mention what we were thinking — does leave us a bit abashed. But unbowed. Willkie's "whiplash of public opinion" has kept us on our toes for 34 years, else why would so many operators TRY PELCO FIRST? And what is sauce for the goose is still sauce for the gander.



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Ogemaw County Wildcat Swabs From Detroit River

Alvin H. Weber's State F1, wildcat NW SW NW 33-24n-2e, Ogemaw County, plugged back from 5367 ft to 4600 ft, swabbed an average of 21 bbls daily after 300 gal acid treatment. Production is from Detroit River section of Monroe. Second and bigger acid treatment planned.

Gratiot County—Pine River: First completion in the Pine River district since its discovery this fall, Chartiers Oil Co.'s Thomas 1, NE NE NE 31-12n-3w, 1320 ft north of the discovery, drilled the objective Dundee dry for abandonment at 3301 ft. Second offset, 1320 ft east of the discovery, cased at 3269 ft at base of Bell shale.

Missaukee County—Norwich: Sun Oil Co.'s Horner 3, S½ NE NW 14-24n-5w, drilled Dundee oil pay between 3082 and 3096 ft where it was shutdown to test. Showed 840 ft oil in 5-in casing after standing 10 hrs. If productive in Dundee Horner 3 will open new horizon for area. Two previous wells in the field producing from Richfield lime between 4300 and 4400 ft.

Enterprise: Sun's State A1, S½ SW NW 11-23n-5w, wildcat, was making 400 ft oil and 800 ft water every 48 hrs from Detroit River section of Monroe between 4468 and 4579 ft. Test to be drilled deeper.

Arenac County—Wildcat: Don Rayburn's Mee 1, C NW NW 4-19n-3e, 4 miles north North Adams pool, completed for Berea gas discovery after plugback from 3101 ft, where Dundee was dry. Well gauged up to 600,000 ft after 40-quart shot between 1600 and 1640 ft.

W. L. McClanahan's Milligan 1, SE SE Sec 3-19n-6e, Augres Township, shot with 200 quarts at 4160 to 4200 ft and now cleaning out. Hole was carried to 4307 ft, with a bridge set for the shot at 4200 ft. Wildcat carried 1200 ft of oil natural before shot from Richfield horizon.

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MICHIGAN FIELD COMPLETIONS

Arenac County—Adams: Mogul Oil Co.'s Hanggi 1, c sw se 35-19n-3e, Dundee lime, abnd 2972 ft.

Clare County—Freeman: Taggart Brothers Co.'s Bicknell 28, c ne 8-18n-6w, Stray sand, abnd 1501 ft.

Taggart Brothers Co.'s Delling 27, ne se se 9-18n-6w, Stray sand, 1,100,000 gas, 1482 ft.

Clare County—Winterfield: Taggart Brothers Co.'s Goodrich 8, c nw 5-19n-6w, Stray sand, abnd 1350 ft.

Gratiot County—Pine River: Chartiers Oil Co.'s Allen 1, ne sw nw 32-12n-3w, Dundee lime, abnd 3301 ft.

Missaukee County—Riverside: Turner Pet. Corp.'s Jager 1, n½ nw ne 15-21n-7w, Dundee lime, abnd 3972 ft.

Osceola County—Evart: Sun's Wilcox 1, n½ se nw 27-18n-8w, Dundee pay 3692-3705 ft, flow 478 bbls 20 hrs, td 3705 ft.

Ottawa County—Polkton: Southwest Dev. Co.'s Long 1, ne ne sw 15-8n-14w, Traverse lime, abnd 1942 ft.

MICHIGAN WILDCAT COMPLETIONS

Arenac County—Gas Discovery: Don Rayburn's Mee 1, c nw nw 4-19n-3e, Berea sand 1600 ft, gas pay 1600-10 ft, Traverse lime 2116 ft, Dundee lime 2934 ft, sw 2994 ft, td 3101 ft, pb 1640 ft, shot 40 qts, gauged 410,000 gas, 910 lbs rock pressure.

Calhoun County—Failure: Ashby Drilling Co.'s Hubbard 1, se se nw 7-2s-5w, abnd 2300 ft.

Mecosta County—Failure: Gulf's Warner 1, c nw se 21-15n-7w, Dundee 3861 ft, abnd 4030 ft.

Osceola County—Failure: Sun's Gierum 1, s½ se se 24-17n-8w, Dundee 3946 ft, abnd 3953 ft.

Wayne County—Failure: Voorhees Drilling Co.'s Otter 1, ne sw ne 18-4s-9e, Trenton 2526 ft, abnd 2679 ft.

MICHIGAN WILDCAT START

Jackson County: Ohio's Taylor 1, ne ne 8-2s-1w, dr.

Rocky Mountain Area

Horse Creek Discovery Pumps 586 Barrels

Horse Creek, Wyoming, discovery pumps 586 barrels,. Wyoming apparently has new oil field discovery at North Hiawatha. Extension indicated for deep Tensleep zone, Pilot Butte, Wyoming. Twin Rivers Nose discovery, Montana, succeeds in shutting off water.

Horse Creek: General Petroleum Corp.'s 78-31-G (Government), SW SE SE 31-17n-68w, Horse Creek, Laramie County, Wyoming, pumped 586 bbls daily average on production test from Lakota at 5451-89 and 5490-5510 ft; td 5531 ft. Company is woc 10¾-in at 744 ft in 74-6-P (Whittaker), SW SE NE 6-16n-68w, half-mile south of the discovery.

North Hiawatha: Vermillion Oil Co.'s Government 1, SW NE NE 6-12n-99w, plugged back from 3420 ft to 2627-45 ft and pumped 65 bbls first 24 hours from a sand in the Wasatch (Tertiary). Well is still testing, but apparently proves North Hiawatha area for oil, four miles north of the East Hiawatha oil and gas field, southwestern Wyoming and northeastern Colorado.

Ramsey Test: Ramsey Petroleum Corp. is spudding Graham 1, C SW SW SW 14-7n-59w, Buckingham-New Raymer district, Colorado, a test through the Dakota series to 6750 ft. Wildcat is located one third mile southeast of company's St. Anthony 1, which gauged 6.0 ft gas under 1800 lbs rock pressure in 1932.

Pilot Butte: Superior Oil Co.'s Hoffman 2, C EL NE SW 22-3n-1w, half mile south of nearest deep production, Pilot Butte field, Wyoming, topped the Tensleep at 6230 ft and is coring in saturated sand at 6283 ft indicating extension. Well is checking high on the Tensleep.

Twin Rivers Nose: Ed Reagan's Tribal-194 2, C NW NE 27-37n-7w, Twin Rivers Nose, northern Montana discovery, reported several weeks ago, has shut off bottom-hole water and is flowing 70 bbls of clean oil daily from the Madison lime at 3899 ft. Operator is deepening his Tribal-194 1, half mile to the north, which completed in 1941 for 6.0 ft gas, stopping 45 ft below the top of the Madison, while the oil discovery encountered oil saturation 65 ft below the Madison top.

MONTANA FIELD COMPLETIONS

Glacier County—Cut Bank: Glacier Production Co.'s Bailey 2, csw sw 7-33n-5w, swab 225 bbls, Lower Cut Bank 3090-97 ft, td 3099 ft.

Wilkinson-Potter's Allotted 5, se se se 1-32n-6w, elev 3670 ft, pump 22 bbls, 2993 ft.

Phillips County—Bowdoin: Montana-Dakota Utilities' 696, ne sw sw 36-32n-33e, .648 ft gas, rp 225 lbs, Bowdoin sand 715-760, Phillips sand 880-920, td 960 ft.

Toole County—Kevin-Sunburst: C. Leonard Smith's Gov't 3, ne ne ne 13-35n-2w, pump 15 bbls, 1549 ft.

Texas Pacific Coal & Oil Co.'s Kalispell-Kevin 1, se sw se 29-35n-2w, pump 25 bbls, td 1520 ft.

WYOMING FIELD COMPLETIONS

Fremont County—Big Sand Draw: Sinclair-Wyoming's Unit 13, ne sw se 10-32n-95w, 6.0 ft gas, Dakota, 4440 ft.

Fremont County—Pilot Butte: British-American's Enos 1, cel nw nw 22-3n-1w, pump 480 bbls, Tensleep saturation 6305 ft, td 6396 ft.

Natrona County—South Casper Creek: Investors Oil Co.'s Gov't 5, sw nw ne 3-33n-83w, pump 35 bbls, Tensleep, 2582 ft.

Park County—Oregon Basin: Ohio's Laven-

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dar-OPC 6, nw ne se 30-51n-100w, Embar 3310 ft, td 3710 ft.

Sublette County — LaBarge: Texas' Gov't 1-FX, sw sw nw 34-27n-113w, pump 27 bbls, 1419 ft.

Sweetwater County—Wertz: Sinclair-Wyoming's Unit 29-A, se ne se 1-26n-90w, pump 480 bbls, Tensleep 6020 ft, td 6332 ft.

WYOMING WILDCAT COMPLETIONS

Laramie County—Horse Creek: New Field: General Petroleum Corp.'s 78-31-G (Gov't), sw se se 31-17n-68w, 586 bbls 31-d API gravity light oil Lakota 5451-89 ft, 1 ft shale break, 5490-5510 ft, td 5531 ft. Surface elev 6780 ft, Niobrara 4210 ft, Muddy 5256 ft, Dakota 5419 ft, Lakota 5451 ft, Morrison 5514 ft.

WYOMING WILDCAT START

Park County—McCullough Peaks: Tri-Good Oil Co.'s Wilson 1, nw ne nw 28-54n-100w, rur.

California

Four Wildcat Tests Scheduled to Start

Two exploratory tests slated for Kern County, and one each for Madera and Ventura counties; Kings County and Santa Barbara County tests abandoned.

Kern County: Republic Petroleum Co. has leased 1500 acres in the Edison area in vicinity of 5-30-29 and has staked locations for a series of three test wells, the first of which will be started immediately.

Reserve Oil & Gas Co. has staked location for another test of the Grapevine-Tejon Ranch area, 34-11-19. The company has drilled a series of wells in 33-11-19 and other companies have also extensively prospected the area.

Kings County: Dudley Ridge Oil Co. has abandoned its test in the Dudley Ridge area, 3-23-19 which was bottomed at 1627 ft in wet sand.

Madera County: Two miles east of an unsuccessful test drilled to 4615 ft in the Gill area, The Texas Co. is preparing to drill a test in 16-13-16.

Santa Barbara County: After drilling to 6123 ft and recovering only mud and drilling fluid on production test of interval above plugged bottom at 5320 ft, Universal Consolidated Oil Co. is abandoning Careaga 1, wildcat in 5-8-33, Careaga area. Top of Miocene was at 4200 ft.

Ventura County: Seaboard Oil Corp. has awarded a contract for drilling of a deep test in the Shiells Canyon area, 3-3-19.

CALIFORNIA FIELD COMPLETIONS

Fresno County—Coalinga Old Field: Shell's **No. 161-32**, 379 ft s 1745 w nec 32-19-15, pump 245 bbls 17.4-gr, perf 2675-2633, 2601-2644 ft, td 2677 ft, base black shale 2547 ft.

Standard's No. 113-13D, 1498 ft n, 1649 w sec 13-20-14, pump 66 bbls, 420 ft perf 1500 ft, Tembolar 1222 ft, Kreyenhagen 1497 ft, td 1510 ft.

Fresno County—Riverdale: Amerada's Clemente 72-22, 940 ft s, 990 w nec 22-17-19, flow 222 bbls 38.6-gr, 11/64-in, 890/580 lbs, perf 6775-6805 ft, td 6900 ft.

Kern County — Belridge South: Belridge's 37-33, 1258 ft n, 1400 e swc 33-28-21, pump 60 bbls 14.9-gr, 216 ft perf 800 ft, td 800 ft.

Belridge's 47-33, 1258 ft n, 2065 ft e swc 33-28-21, pump 76 bbls 16.1-gr, perf 406-666, 685,775 ft, td 775 ft.

Belridge's 77-33, 1258 ft n, 1360 w sec 33-28-21, pump 50 bbls 22.1-gr, perf 414-750 ft, td 750 ft.

Belridge's 37-34, 1150 ft n, 1825 e swc 34-28-21, pump 10 bbls, perf 574-768 ft, td 768 ft.

General's Belridge 3-39, 1800 ft n, 688 e w¼c 3-29-21, pump 59 bbls 14-gr, perf 557-712, 738-950 ft, td 960 ft.

Ohio's Hopkins Fee 10, 1304 ft s, 1199 w nec 4-29-21, pump 52 bbls 13.5-gr, 232 ft, perf 878 ft, td 880 ft.

Kern County—Kern Front: Westates Petroleum Corp.'s Cauley 38, 1410 ft s, 330 e nwc sw nw 16-28-27, pump 108 bbls 15.2-gr, 47 ft perf, 2926 ft, td 2926 ft.

Kern County—Midway-Sunset: H & T Oil Co.'s No. 7, 830 ft n, 302 w sec n½ nw 15-31-23, pump 2 bbls 12.4-gr, 152 ft perf, 999 ft, td 1060 ft.

Standard's No. 117-11D, 2192 ft s, 1424 w nec 11-32-24, pump 31 bbls 27-gr, 61 ft perf, 3022 ft, Scalez 2955 ft, td 3022 ft.

Kern County—Mount Poso: Chanslor-Canfield's Mon 9, 2033 ft s, 2970 e nwc 26-27-28, pump 55 bls 15-gr, 37 ft perf, 1503 ft, Vedder 1465 ft, td 1503 ft.

Kern County—Poso Creek-Premier: Standard's No. 7-8, 985 ft s, 330 w e¼c 8-28-27, pump 129 bbls 16.4-gr, 153 ft perf, 2863 ft, td 2865 ft.

Kings County—Kettleman Hills North Dome: KNDA's 341-12P, 663 ft s, 660 w nec 12-22-17, flow 197 bbls oil, 7,100,000 gas, 3080/3300 lbs, 306 ft perf, 10,300 tf, td 10,305 ft.

Los Angeles County—Coyote East: Union's Hole 24, 2099 ft s, 1515 e nwc 22-3-10, flow 216 bbls 24.8-gr, 24/64 bean, 210-490 lbs, 653 ft perf, 3735 ft, td 3738 ft.

Orange County—Huntington Beach: Westport Oil Co.'s No. 8, 380 ft n, 280 e c/l's Garfield & Huntington Beach Blvd, pump 80 bbls 16-gr, perf 3834-3874 ft, td 3898 ft.

Ventura County—Sespe: Merchants Petroleum Corp.'s Cochran 5, 1100 ft s, 900 w nec 1-4-20, pump 180 bbls 22-gr, 700 ft perf, 2005 ft, otd 1527 ft, td 2018 ft.

CALIFORNIA WILDCAT COMPLETIONS

Kern County—Failure—Mount Poso area: Ring Oil Co.'s Glide 2, 330 ft n 1435 ft w sec n½ s½ nw¼ 19-26-28, barren Vedder 1984 ft, abnd 2003 ft in gray sand.

Kern County — Failure — Round Mountain area: Shell's Jewett 1-16, 2280 ft s 3616 e nwc 29-28-29, silty Jewett oil sand 1790 ft, gray sand 1915 ft, Vedder 1966 ft, abnd gray sand 2100 ft.

CALIFORNIA WILDCAT STARTS

Butte County: Pacific Western's Cana 1, 11-23-1, lcn.

Superior's Dodge Land Co. 1, 30-20-1, rig.

Kern County: D. D. Dunlap's Dyer Creek 1, 11-26-27, lcn. Dyer Creek area.

Di. Giorgio Fruti Corp.'s No. 1, 12-31-29, rigging up. Mountain View area.

Los Angeles County: Duquesne Oil Co.'s Eunice 1, 3-3-14, lcn. Potrero area.

Flintkote Co.'s Strawbridge 1, 12-2-11, lcn. Puente Hills-Turnbull Canyon area.

Madera County: Texas Co.'s Gill 38-16, 16-13-16, foundation. Mendota area.

Ventura County: J. J. Stevens' Corehold 1, 31-4-20, preparing to spud. Santa Paula area.

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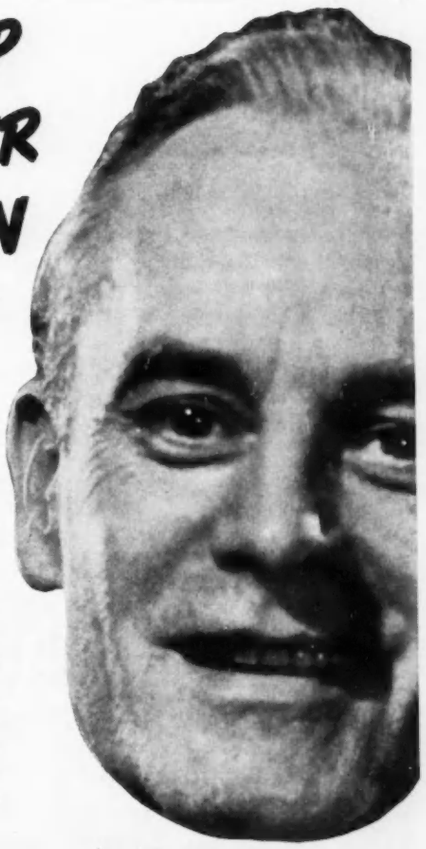

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NEW YORK COMPLETIONS

Allegany County: Bradley Prod. Corp.'s Nobles farm, Alma, 10 bbls, Richburg, 1340 ft.

Pure Penn Pet. Co.'s Mulkins farm, Bolivar, 7 bbls, Richburg, 1449 ft.

South Bolivar Oil Co.'s McKelvey farm, Bolivar, 8 bbls, Richburg, 1359 ft.

R. B. Moore et al's Moran farm, Bolivar, 6 bbls, Richburg, 1244 ft.

Ebenezer Oil Co.'s Vincent farm, Scio, 12 bbls, Richburg, 1144 ft.

Bradley Prod. Corp.'s Sprague farm, Alma, 6 bbls, Richburg, 1329 ft.

Messer Oil Corp.'s "M," Allen farm, Alma, 7 bbls, Richburg, 1350 ft.

Scott & Sackinger's Scott farm, Bolivar, 7 bbls, Waugh-Porter, 1439 ft.

Wilson Oil Co.'s Wales farm, Genesee, 10 bbls, Richburg, 1325 ft.

Bradford Prod. Corp.'s Birtcil farm, Wirt, 5 bbls, Richburg, 1440 ft.

Otsquago Corp.'s Pike farm, Alma, 9 bbls, Richburg, 1367 ft.

Ford Oil Co.'s Kemp farm, Alma, 6 bbls, Richburg, 1333 ft.

H. W. Patterson et al's Browning farm, Scio, 5 bbls, Scio, 749 ft.

Bradley Bros. Inc.'s Sawyer farm, Bolivar, 6 bbls, Richburg, 1358 ft.

McEwen, Stout et al's Roeske farm, Wellville, 5 bbls, Fulmer, 1373 ft.

Rico Oil Co.'s Wright farm, Scio, 6 bbls, Scio, 945 ft.

Healy Oil Co.'s Garthwaite farm, Bolivar, 6 bbls, Waugh-Porter, 1549 ft.

Messer Oil Co.'s Koehler farm, Clarksville, 6 bbls, Richburg, 1351 ft.

C. S. Christman & Son's Beckwith farm, Wirt, 8 bbls, Richburg, 1342 ft.

NEW YORK INTAKE WELLS

Allegany County: Vosburg Oil Co.'s Green farm, Bolivar, Richburg, 1310 ft.

New York Oil Co.'s Gadsby farm, Bolivar, Waugh-Porter, 1447 ft.

Messer Oil Corp.'s "M," Allen farm, Alma, Richburg, 1370 ft.

McEnroe & Brown's Witter farm, Alma, Richburg, 1269 ft.

L. H. Thornton et al's Fassett farm, Willing, Fords Brook, 1274 ft.

Scio Oil & Gas Co.'s Clark farm, Scio, Scio, 780 ft.

H. W. Patterson et al's Black farm, Scio, Scio, 868 ft.

J. & W. Oil Co.'s Peterson farm, Wirt, Richburg, 1368 ft.

A. C. Shaner Oil Co.'s Childs farm, Clarksville, Clarksville, 1310 ft.

Sawnett Oil Co.'s Merritt farm, Genesee, Richburg, 1432 ft.

A. W. Shaner et al, Johnson farm, Shongo, 500,000 gas, 850 ft.

OHIO COMPLETIONS

Ashland County: I. C. Robinson et al's Derrenberger 1, 1,400,000 gas, 2915 ft.

Athens County: Anderson et al's Russell 2, 350,000 gas, 998 ft.

Ross et al's Colburn 3, 1 bbl, 520 ft.

Fairfield County: City Natural's Kellenger-ger 1, 60,000 gas, 2262 ft.

Guernsey County: Frank Stranges' Stock 1, 20,000 gas, 1470 ft.

Holmes County: Ohio Fuel's Workman 1, abnd 2818 ft.

Knox County: Pat Oil & Gas Co.'s Newton et al 511, 1 bbl, 652 ft.

Ohio Fuel's Watson 1, abnd 2391 ft.

Licking County: Pure's Guthrige 3, abnd 3115 ft.

Loraine County: Ohio Fuel's Adams 1, 1,500,000 gas, 2642 ft.

Medina County: R. C. Holmes et al's Hostetler W 19, abnd 560 ft.

Belmont Quadrangle's Cleveland Park 2, 1,100,000 gas, 3327 ft.

Monroe County: Kramer & Gillespie's McCammon 10, 6 bbls, 1528 ft.

Morgan County: Henry et al's Hoopes 14, 3 bbls, 375 ft.

Ohio Fuel's Fell 1, 160,000 gas, 1079 ft.

Muskingum County: Atha Co.'s Fisher 1, 650,000 gas, 4097 ft.

Noble County: Fasset Oil Co.'s Hayes 11, abnd 240 ft.

Perry County: Preston's Holbein 1, abnd 3386 ft.

Preston's Sunday Creek Coal Co. abnd 3650 ft.

Industrial Gas Corp.'s Rhodes et al 2, 45 bbls, 3260 ft.

Industrial Gas Corp.'s Rhodes 4, 40 bbls, 3262 ft.

Seneca County: Miller & Downey's Smith 1, abnd 1565 ft.

Tuscarawas County: Ohio Fuel's Geit 1, 790,000 gas, 4747 ft.

Vinton County: Ohio Fuel's Wolf 1, abnd 2210 ft.

Washington County: Anderson et al's Greenless 1, 500,000 gas, 1380 ft.

Wayne County: Preston's Piper 1, 45 bbls, 3245 ft.

OLD WELLS DRILLED DEEPER

Meigs County: Nolan Shuster's Fee 2, 210,-000 gas, 885 ft.

PENNSYLVANIA COMPLETIONS

Armstrong County: Equitable Gas Co.'s Waltenbaugh 3280, 60,000 ft gas, 3498 ft.

Peoples Nat. Gas Co.'s McElwain 1, abnd 3476 ft.

Clarion County: Geo. Hall's Thompson 2, 90,000 gas, 2776 ft.

Fayette County: Greensboro Gas Co.'s American Coke & Fuel Co. 4, abnd 2807 ft.

Greene County: Equitable Gas Co.'s Kuhn 1, 790,000 gas, 2340 ft.

Geo. Gray & Son's Bonnell 1, 40,000 gas, 2402 ft.

Westmoreland County: Peoples Nat. Gas Co.'s Bowman 1, 180,000 gas, 3511 ft.

WEST VIRGINIA COMPLETIONS

Boone County: United Carbon Co.'s Silver Coal & Land Co. 1, 410,000 gas, 1544 ft.

Calhoun County: W. V. Knight's Wade 1, 5 bbls, 2178 ft.

So. Penn Nat. Gas Co.'s Sharpes 12, 5 bbls, 2243 ft.

Clay County: Pitts. & W. Va. Gas Co.'s Elk River Coal & Lumber Co. 7871, 210,000 gas, 1906 ft.

Doddridge County: L. G. Piggott's Koch & Williams 1, 110,000 gas, 2483 ft.

Gilmer County: W. H. & L. E. Mossor's Edwards 1, abnd 2482 ft.

Jackson County: Spartan Gas Co.'s Walker 2, 9,280,000 gas, 5096 ft.

United Fuel Gas Co.'s Simmons 1, 7,960,000 gas, 5257 ft.

United Carbon Co.'s Perkins 15, 4,500,000 gas, 5154 ft.

United Fuel Gas Co.'s Fisher 5117, 2,440,000 gas, 5098 ft.

Kanawha County: Columbian Carbon Co.'s Fields 1, 1,060,000 gas, 5311 ft.

Lincoln County: United Fuel Gas Co.'s Lincoln Co. Land Co. Assn. 2217, 89,000 gas, 3127 ft.

Pleasants County: Elk River Gas Co.'s Weatherall 2, 480,000 gas, 2159 ft.

Putnam County: Smith Oil & Gas Co.'s Smith 1, abnd 1661 ft.

Ritchie County: McBurney et al's Schulte 1, 240,000 gas, 2095 ft.

Upshur County: Pitts. & W. Va. Gas Co.'s Munson 7877, 2,380,000 gas, 2863 ft.

Wetzel County: Fred Lough et al's Hemerlick & Church 1, 160,000 gas, 2810 ft.

OLD WELL DRILLED DEEPER

Lincoln County: Turtle Lick Gas Co.'s Thompson 1, 560,000 gas, deepened from 2282 to 3486 ft.

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Men in the Industry's News

DON E. McMAHON, manager of Nicklos Drilling Company, Houston, is passing around cigars, in honor of a new son, Edward, born November 15.

J. H. GRAHAM, formerly with Larking and Graham, Tulsa, is now natural gas and gasoline analyst, district 3, OPC, Houston.

J. B. MORRIS, Magnolia Petroleum Company, Tyler, has transferred to Oklahoma City.

E. ALLAN MORROW, production superintendent for C. L. Maguire, Inc., elected chairman of Michigan chapter of the American Petroleum Institute. Morrow succeeds C. C. Irby, production engineer, Turner Petroleum Corporation, as chapter chairman. Other new officers elected include Walker Franks, Gordon Oil Company, 1st vice chairman, succeeding Morrow; Glen Sleight, Sun Oil Company, 2nd vice chairman, succeeding Franks; and W. E. Schoeneck, Ohio Oil Company, secretary-treasurer, succeeding Sleight.

MARSHALL R. JOY, assistant district superintendent in the Michigan-Illinois division, Cities Service Oil Company, has been transferred to the company's New York office, effective December 1. Joy will be succeeded in Michigan and Illinois by Coxey C. Evans, who was transferred from Seminole, Oklahoma.

The above photograph shows what can happen when an oil man and an equipment man get together with a gun pointed in the direction of ducks. The gentleman with the city slicker clothes is Elmer Decker of Martin-Decker Corporation. The man who looks like a real hunter is Sam Bowlby, Los Angeles Basin Division Manager of Shell Oil Company. Sam formerly was manager in Southern Louisiana for the Shell. The duck shooting took place in California to which point the Louisiana ducks apparently had followed hunter Bowlby. Decker, it may be added, is not wearing what the well-dressed duck hunter should wear.

E. C. SEYMOUR, controller of Magnolia Petroleum Company, Dallas, Texas, has been elected to membership in the Controllers Institute of America, a technical and professional organization of controllers devoted to improvement of controllership procedure.

G. S. TAITT, formerly chief exploitation engineer for United British Oilfields of Trinidad, is now in the exploration department of Shell Oil Company at Houston.

D. O. BARRETT, Gulf Oil Corporation, addressed Engineers Club of Tulsa November 23 on engineering means of combatting war-shortages in the oil field.

J. D. McCAMEY, safety engineer for Carter Oil Company, Tulsa, has been commissioned as a captain in the Army.

ROBERT B. CAMPBELL, consulting geologist of Tampa, Florida, has been elected president of the Florida Academy of Science to serve throughout 1942-43.

GEORGE D. GILBERT has been appointed general manager of Baldwin-Duckworth, Milwaukee, Wisconsin. William H. Gates also has been named works manager of the company, which operates plants in Springfield and Worcester, Massachusetts.

JOHN P. SMOOTS, who has been in charge of all production for Standard Oil Company of Ohio, has been named manager of the exploration and geological department. Earl D. Wallace has been named manager of the land and production department. Smoot has been with the company since 1928 when he joined the organization to do process development work. He has been in charge of the company's production activities ever since it entered that field of operations. Wallace resigned from Petroleum Exploration Company to accept his new post.

J. D. HUNTER, West Texas operator and resident of Midland past 4 years, has reported for duty as a first lieutenant in the Engineering Corps of the Army.

GEORGE PUTNAM, chief geologist for Lario Oil & Gas Company, Wichita, Kansas, spent the past week at Midland, Texas, where the company is establishing a district office to operate in the Permian Basin. B. Al Ray, who recently resigned from Tide Water Associated Oil Company's geological staff, will have charge of the Midland branch.

ROBERT R. THOMPSON, chief geologist for Danciger Oil & Refineries, Inc., has resigned to accept similar position with Snowden & McSweeney Company, Fort Worth. He is a native of Minneapolis, and received degree in geology at Minnesota University. Served as assistant instructor in geology while taking post graduate work at Williams College, Williamstown, Massachusetts. Initial contact with oil came in 1917 when he joined The Texas Company's geological department at Houston. Served in the Army during World War, then rejoined latter

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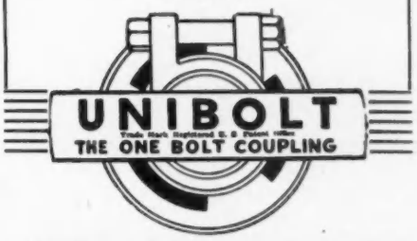

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company at Wichita Falls. Resigned March, 1920, to work for Harrison & Eaton, Denver, in Ranger district. This connection led to his appointment as head of Texas Pacific Coal & Oil Company's geological department that was established in 1921 at Thurber, Texas. In 1926, he switched to consulting work at Fort Worth, then in October, 1929, was placed in charge of geological department of Danciger Oil & Refineries, Inc.

HERMAN STABLER, chief of the conservation branch of the United States Geological Survey, died November 24, in Washington. Stabler had been chief of the conservation branch of the department since its organization in 1925, and had been with the survey nearly 40 years.

FRANK J. WESCHLER, vice president of Chain Belt Company of Milwaukee, and general manager of Baldwin-Duckworth, a division of Chain Belt Company at Springfield and Worcester, Massachusetts, died November 10 in Worcester.

J. N. PHELAN, JR., Houston oil operator, has been commissioned a flight officer in the Royal Air Force and has been transferred from a training base at Terrell, Texas, to foreign duty.

British Columbia Gasoline Sales Show Increase

Gasoline sales in British Columbia during September totaled 6,175,311 gallons, an increase of 186,162 gallons over August but a decrease of 13,758 gallons compared with September, 1941, it was announced by Dr. W. A. Carrothers, chairman of the Coal and Petroleum Board.

Vancouver and district increased its retail consumption of gasoline by 21.3 percent over September, 1941.

There was no explanation for this, but many war industry trucks on the mainland have been buying gasoline at retail stations, and private motorists, when gasoline categories were announced, may have filled up their tanks by using their existing ration tickets at one time.

Squeaks from the Bull Wheel

Fine Distinction

"My sin is vanity, I spend hours admiring my good looks."

"That's not vanity, that's imagination."

Walla Walla

"Hawaii, gentlemen, Yuse must be Hungray to eat in a dump like this."

"Yes, Siam. Venice lunch ready? We can't Rumania long. Can't Jamacia a little more speed?"

"I'll Russia to a table and Fiji fast. Japan the menu yet? The Turkey is Nice."

O.K., Turkey. And I Bolivia can put a Cuba sugar in my Java."

"Sweden it yourself. I'm only here to Servia."

"Don't Genoa customer is always right? What's got India? You think arguing Alps business? Call the Bosphorus. He'll probably Kenya."

"Canada racket. 'Spain in the neck."

Vital

"I would like to see the Judge, please."

"Sorry, sir, but he is at dinner."

"But this is important."

"Can't be helped, sir. His Honor is at steak."

Just Works

"Is Mrs. DeMurr an active member of your sewing circle?"

"My goodness, no! She never has a word to say—just sits there and sews all the time."

Never

"William, how do you suppose those dozens and dozens of empty bottles got into the cellar?"

"I'm sure I don't know. I never bought an empty bottle in my life."

Opportunity

"Do you believe in free speech?"

"Why, certainly I do."

"Fine. Let me use your telephone."

Colorful Language

In its review of the language scene, "American Speech" recently paused to examine expressions which belong to the truck driver. Here are examples:

"A truck that does not leak oil, grease or water, is house broken. A refrigerator truck is an ice wagon; an antiquated truck is a dog wagon. A nitroglycerin truck is a boom wagon, and the driver is a suicide jockey. Police are simply the men. A truck that uses too much gas is said to be working for Standard Oil, while one with a noisy engine or broken muffler is a cement mixer. A poultry truck is a cackle wagon; a sugar truck is a crate o' sand. If there is no glass in the cab, it is a pneumonia sedan; a sleeper bus is a pajama wagon. When a driver goes through a vehicular tunnel, that's a ride in the cellar; when he coasts to a parking place, he beaches her. To wreck a truck is to stack it up; and a driver who persists in riding with the window open in cold weather is training to be an Eskimo."

Fast Work

The tale has been told of a storekeeper who took out a whopping big fire insurance policy on his stock. And the very same day his store burned to the ground, and not a dime's worth of merchandise was saved.

The president of the insurance company put his best men on the case, but two weeks of diligent investigation proved nothing.

Thoroughly chagrined, the president whipped out a letter to the ex-storekeeper.

"Dear Sir: You took out an insurance policy with our company at 11 a.m. and your store did not catch fire until 4:30 p.m. of the same day.

"Will you kindly explain the delay?"

Hooked at Last

Think of it. Here's a couple who got married after a fifty-year courtship.

I suppose the old fellow was too weak to hold out any longer.

Good News

When driving through the countryside, Hitler's car ran over and killed a small dog. Halting the car, der fuehrer sent his chauffeur to the farmhouse to express regret. The driver came back a few minutes later with a big package under his arm.

"The farmer was not angry," he assured der fuehrer.

"What did you say to him?" insisted Hitler.

"When I went to the door," the driver explained, "I saluted and said, 'Heil Hitler—the dog is dead.' The farmer yelled 'Hooray,' and gave me a big ham."

Answers

"How do bees dispose of their honey?"

"They cell it, I believe."

NOTICE

We wish to announce the sale of our MACHINE SHOP ONLY at Oklahoma City to a Mining Company, which we think is needed more in the War Effort than the work we were doing.

We are going to maintain our Warehouse and Office at the same address and will continue to fill all orders for our Products as near as possible under the present War Conditions.

When conditions change, we expect to build a New and Modern Plant with the latest type machinery and carry on our business of serving the Oil Field trade.

Please call on us as usual and we will do our best to fill your orders.

BRAUER MACHINE & SUPPLY COMPANY

PHONE 2-3014 BOX 1469 OKLAHOMA CITY, OKLAHOMA

Notes for the Equipment Buyer and User

Solvent

CURRAN CORPORATION

The Curran Corporation, Boston, Massachusetts, has announced development of concentrated self-emulsifying degreasing solvent. It has been found valuable for its ability to dissolve, emulsify and remove heavy accretions of bunker C fuel oil in the presence of salt water.

The outstanding features of this new colloidal emulsifying solvent is that the degreased surfaces are particularly compatible for the application of red lead undercoat.

It is claimed that because of the powerful penetrating and emulsifying action, all traces of oil are made water soluble and need only be sluiced with a water hose to rinse and decontaminate large areas such as the hold of war ships.

Synthetic Corundum

LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, 30 East 42nd Street, New York, has announced that synthetic white sapphire —the mineral corundum unpigmented and of gem quality—is now available in the form of boules.

The boules, the form in which the sapphire is manufactured, each weigh at least 150 carats and are of a regular cylindrical shape, enabling gem cutters to standardize on cutting and sawing procedures. The material, as now made, is practically perfect, any imperfections being microscopic in size and having no effect whatever on the quality of the material for precision bearing surfaces and other essential industrial parts.

Instigated by the need of a domestic source of industrial gems, the manufacturer in less than two years equalled and, in some respects, has surpassed the quality of European gems, formerly the only synthetics obtainable. Since domestic production started, it has grown so that it is now capable of handling the entire military demand for all the United Nations.

Mineralogically, the hardness of the American white sapphire is exceeded only by the diamond. Once they are cut, the jewels are also surprisingly tough in terms of resistance to breakage by impact. Moreover, because they have a melting point of over 3700° F., they are also heat resistant to a high degree. An additional advantage is the boules' uniformity of size and shape, which leads to economical cutting.

Many essential uses are already being made of jewels cut from these synthetic boules. Among locations where they serve economically are as the jewel bearings of chronometers, compasses, and electrical, fire-control, and aircraft instruments. In such instruments, they are employed in the form of ring bearings or V-type and cup-type end bearings. Pallets are also made for watch escapements.

Other successful although still experimental uses of the white sapphires are as thread guides in the manufacture of rayon, as orifices for flow meters and

American-made sapphire boules. Left, a 200-carat boule typical of present commercial production. Right, the 1943 model, one of the largest yet made by The Linde Air Products Company. It weighs about 350 carats and its total actual length is 2¾ inches.

oil-burning equipment, and as insulators in gas-filled or vacuum thermionic devices. Indications are that they are also suitable for use as diesel-engine injector nozzles, as rollers for small needle bearings, and for cutting tool tips to perform high-speed finishing operations on certain non-ferrous metals. Their complete chemical inactivity when exposed to all types of corrosion except strong mineral acids and alkalies may suggest additional uses to designers of chemical equipment.

Bucyrus-Erie Wins Army-Navy "E" Award

In a ceremony highlighted by a salute to members of the armed forces who have given their lives in the service of the country, officers of the Army and Navy presented the Army-Navy "E" award to Bucyrus-Erie Company's South Milwaukee Plant, November 7.

Brig. General G. M. Barnes, U. S. Army Ordnance Department, paid tribute to the record of production. Captain D. D. Dupree, U. S. Navy, decorated employes with "E" buttons.

Addresses in behalf of the company were made by W. W. Coleman, president, N. R. Knox, vice president and Robert Scott, representing employes.

Cutting Tools

Haynes Stellite Company, Kokomo, Indiana, has issued a new booklet on "Stellite 98M2 Metal-Cutting Tools for Machining Steel." This publication lists the sizes and prices of 84 standard square and rectangular tools bits, and of 74 varieties of welded-tip tools—all made of 98M2, the recently announced, non-ferrous cutting-tool material which has proven so successful for machining steel.

Recommendations regarding grinding wheels for use on tools made of this alloy are also presented for several types of hand- and machine-grinding operations.

Acetylene Association Elects New Officers

Newly elected officers of the International Acetylene Association, chosen at the annual meeting in Cleveland, Ohio, recently, are: Ellsworth L. Mills, president; Glenn O. Carter, vice president; Herbert F. Reinhard, secretary; and Philip Kearny, treasurer.

Mills is vice president of the Bastian-Blessing Company, Chicago, manufacturers of oxy-acetylene welding and cutting equipment. Carter is a consulting engineer with The Linde Air Products Company and a member of the executive board of the Compressed Gas Manufacturers' Association. Reinhard, who will serve as secretary for the eleventh time, is associated with Union Carbide and Carbon Corporation, New York. Kearny, who has previously served as a director, vice president, and president of the association, is president of the K-G Welding and Cutting Company of New York City.

Directors for the coming year are Henry Booth, vice president, Shawinigan Products Corporation, New York City; E. L. Mathy, vice president, Victor Equipment Company, San Francisco; and R. B. Swope, president, Southern Oxygen Company, Inc., Arlington, Virginia.

Members of the executive committee of the association for next year are: H. S. Smith, Union Carbide and Carbon Corporation; C. D'W. Gibson, vice president (sales), Air Reduction Company, Inc.; and Kearny.

Woodbank Pump and Machinery Opens Office in Houston

Woodbank Pump & Machinery Company announces opening an office in the Kress Building, Houston, to provide more active representation of the products they handle—principally Cook's graphitic iron piston rings and Cook's metallic rod packings. The office will be in charge of F. Black who previously made his headquarters in Fort Worth.

Shovel, Dragline, Crane

Link-Belt Speeder Corporation, Chicago, has issued a 12-page catalog on its 1½-yard, heavy-duty model LS-120 crawler shovel, crane, dragline.

Included among the features of this machine are these: all-welded unit construction instead of castings; self-aligning center pin bearing; self-aligning rotating rollers, and fully independent rapid boom-hoist.

Book shows both construction details and installation views. General dimensions, clearances, lifting capacities, specifications are given.

Maintenance Digest

Oakite Products, Inc., 57 Thames Street, New York, has issued Wartime Maintenance Digest, describing how new time saving cleaning materials, descaling methods and related techniques are being successfully used throughout

the petroleum industry to shorten equipment downtime, conserve manpower and increase efficiency in handling 41 vitally important, commonly recurring equipment maintenance, plant housekeeping and sanitation jobs.

On each cleaning or related job discussed, this wartime maintenance guide outlines in data sheet form for convenient, quick reference, (1) the material used, (2) method followed, (3) time saved, (4) fire or other hazards eliminated, and (5) other advantages gained essential to increasing operating efficiency as well as securing greater output and longer service from Diesel and gas engines, coolers, condensers, compressors, and other refinery and pumping station equipment.

Motor Finder

Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, has issued a new "Motor Finder" to help motor users fill their wartime motor needs with the least possible delay as well as conform to recent WPB recommendations.

Standard types of the squirrel-cage—the most readily obtainable motor—are actually even more versatile than is commonly realized. Because of this, and important savings in time and materials due to standardization, WPB is urging careful consideration of the squirrel-cage types first.

With the new "Motor Finder" slide-rule, the motor user is able to match the conditions under which the motor must operate at the proposed installation with the required motor characteristics and instantly learn the right motor type and its features.

So handy is the new "Motor Finder," that only three simple steps are necessary to pick a motor. Since over thirty standard types, covering a range in horsepower from ½ to 75, are included in the Allis-Chalmers Lo-Maintenance line, all of the characteristics of versatility of squirrel-cage motors are immediately considered in using the slide-rule. The potential motor buyer thus takes fullest advantage of the most available motors he can buy in wartime.

Alloy Steel Data

The Cooper Alloy Foundry Company, Hillside, New Jersey, has issued a new compact chart showing analyses, physical characteristics and applications of 19 different stainless steel, monel and nickel alloys.

This also contains a handy cross reference of designations and type numbers of the Alloy Casting Institute, the American Iron and Steel Institute, American Society for Testing Materials, Society of Automotive Engineers, U. S. Navy, and others. This reference chart is standard letter size and can be conveniently filed.

Chain Drives

Link-Belt Company, Chicago, Illinois, has issued a factual folder on "First Aid for Faithful Chain Drives." It tells what can be done to keep chain drives running when repairs or replacements are not available. It covers what to do for worn chain and for worn wheels, and shows how to get new life from old chain pins. Seven servicing suggestions are given that will make any chain drive run better and last longer.

Advertisers' Index

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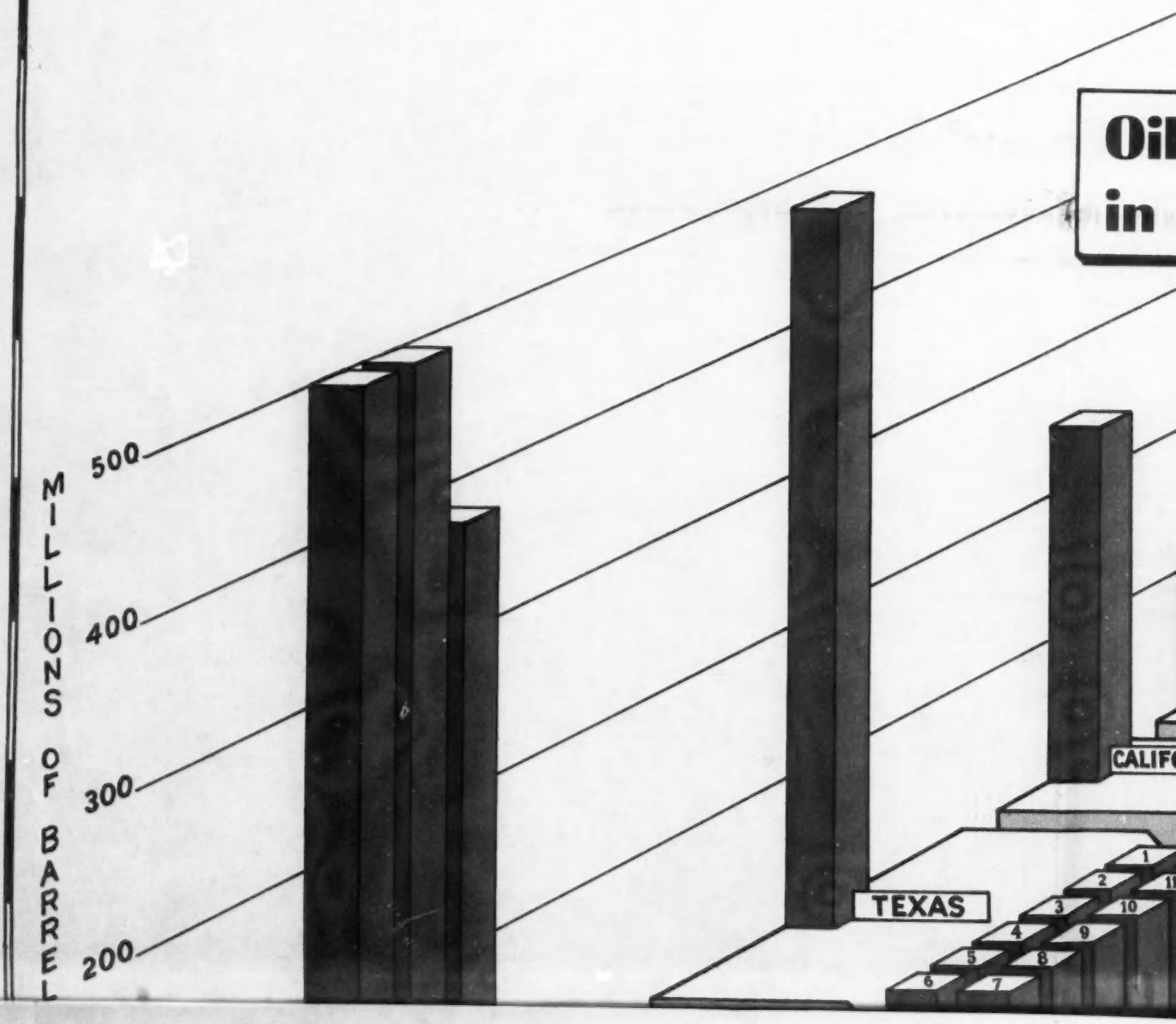
Compiled and Published by

THE OIL WEEKLY

February 1, 1943



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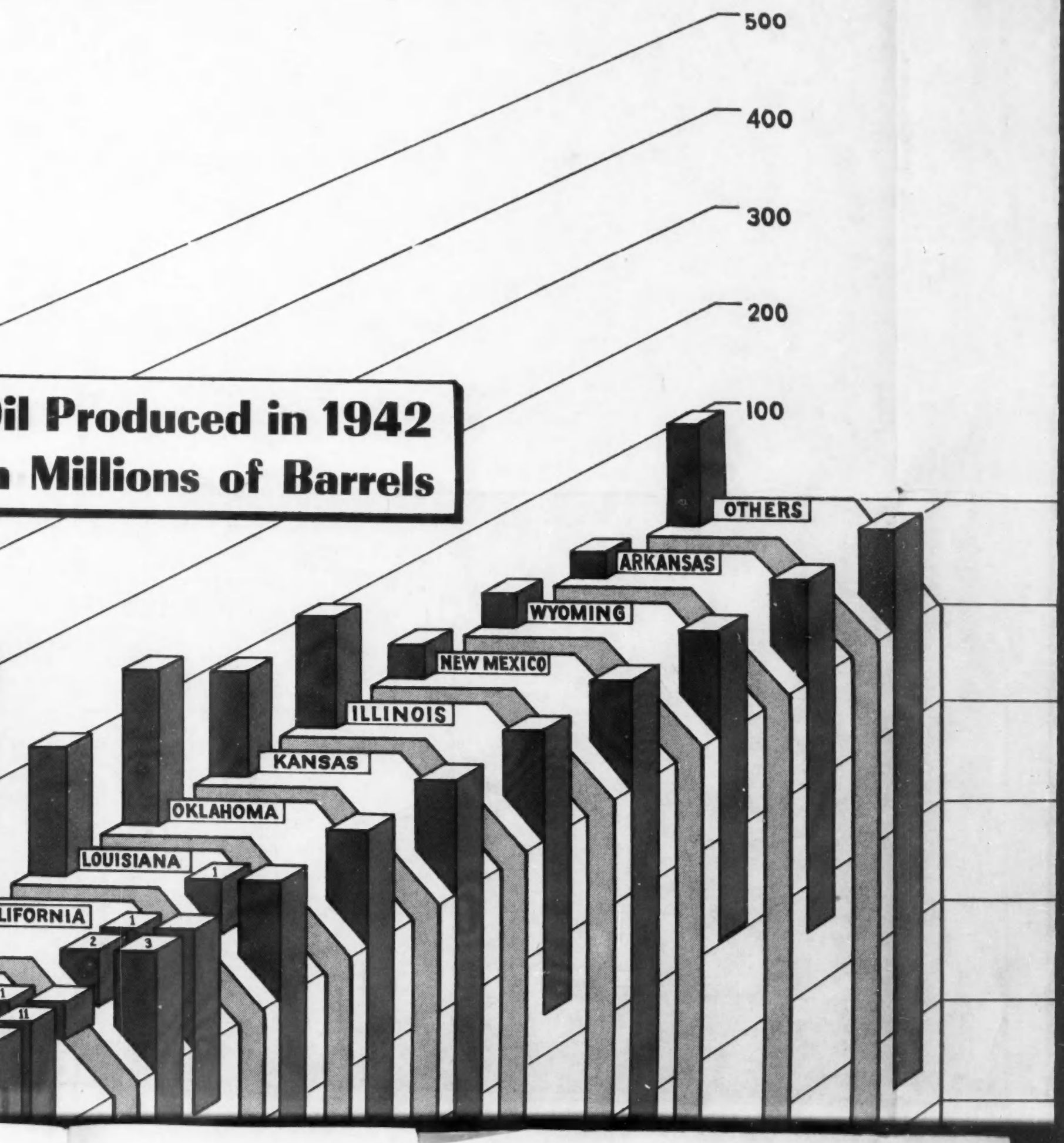

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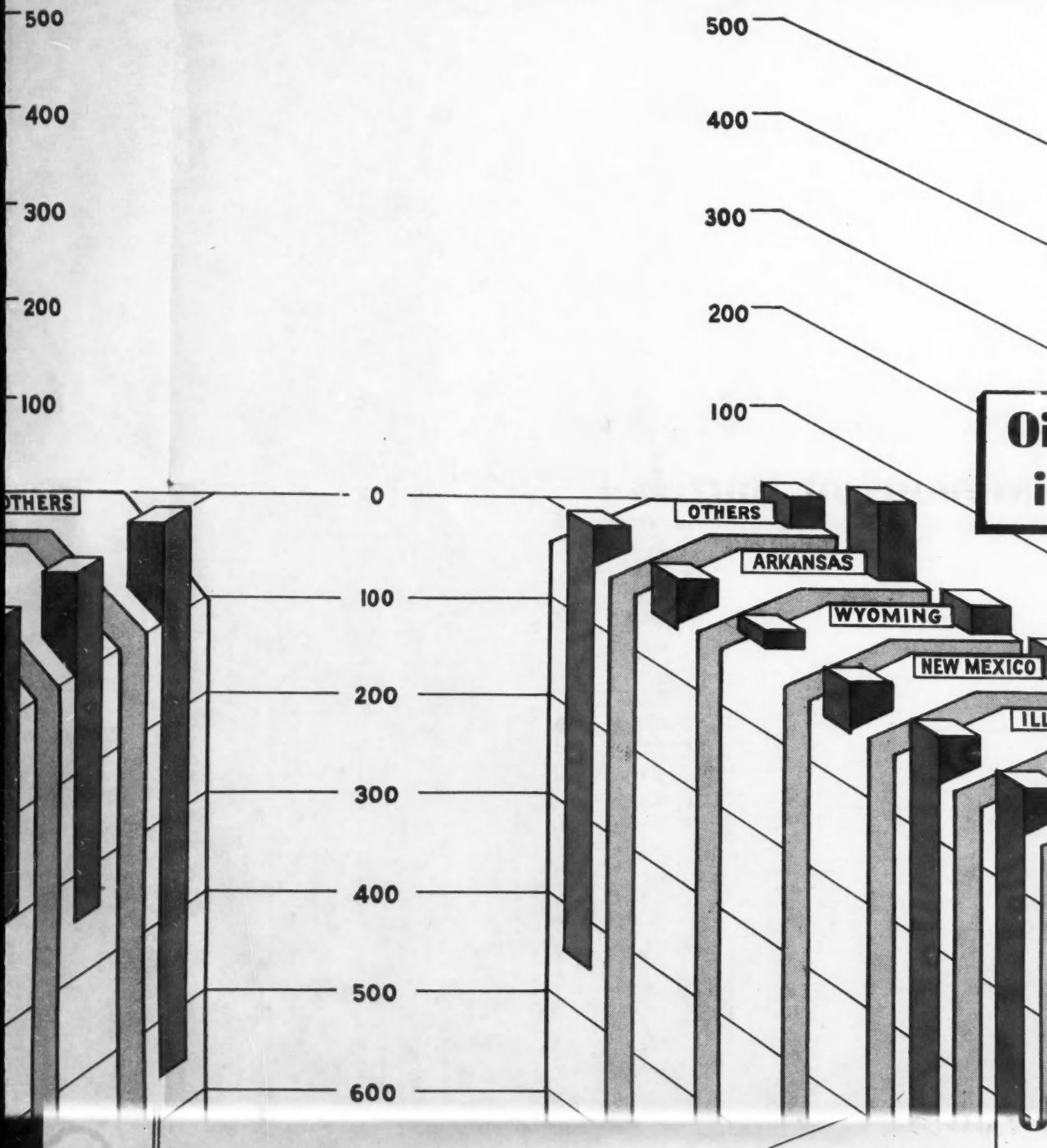

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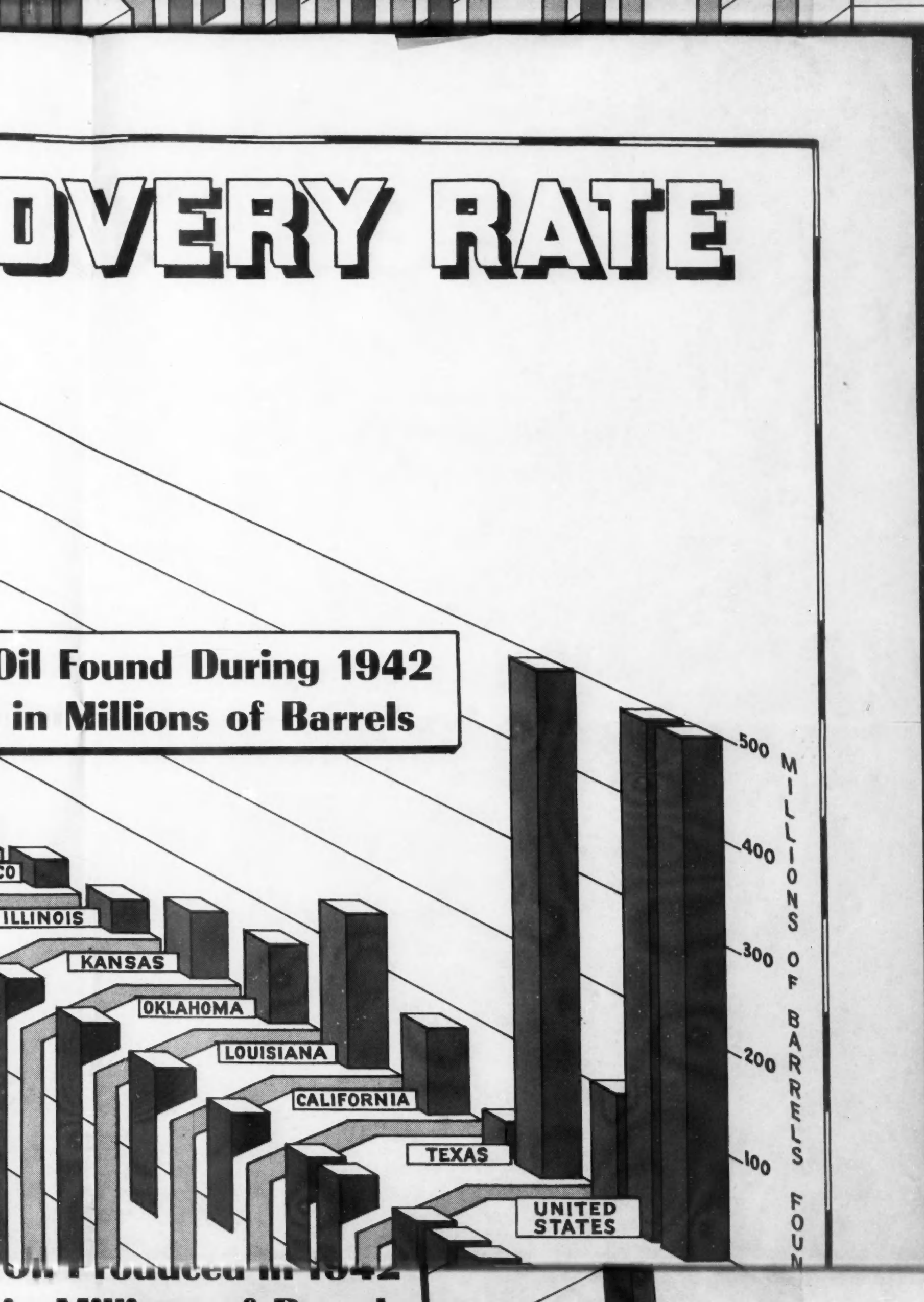

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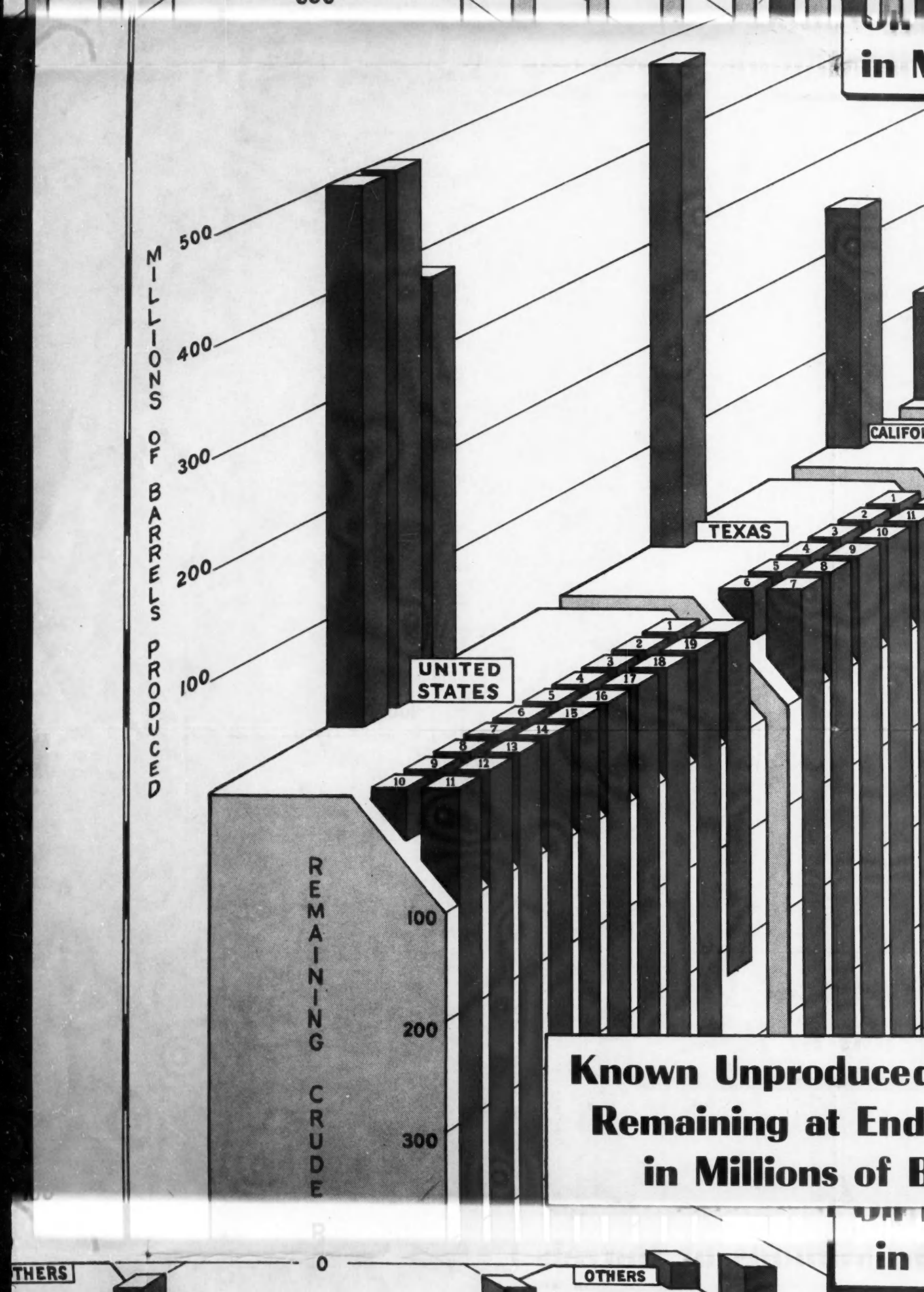
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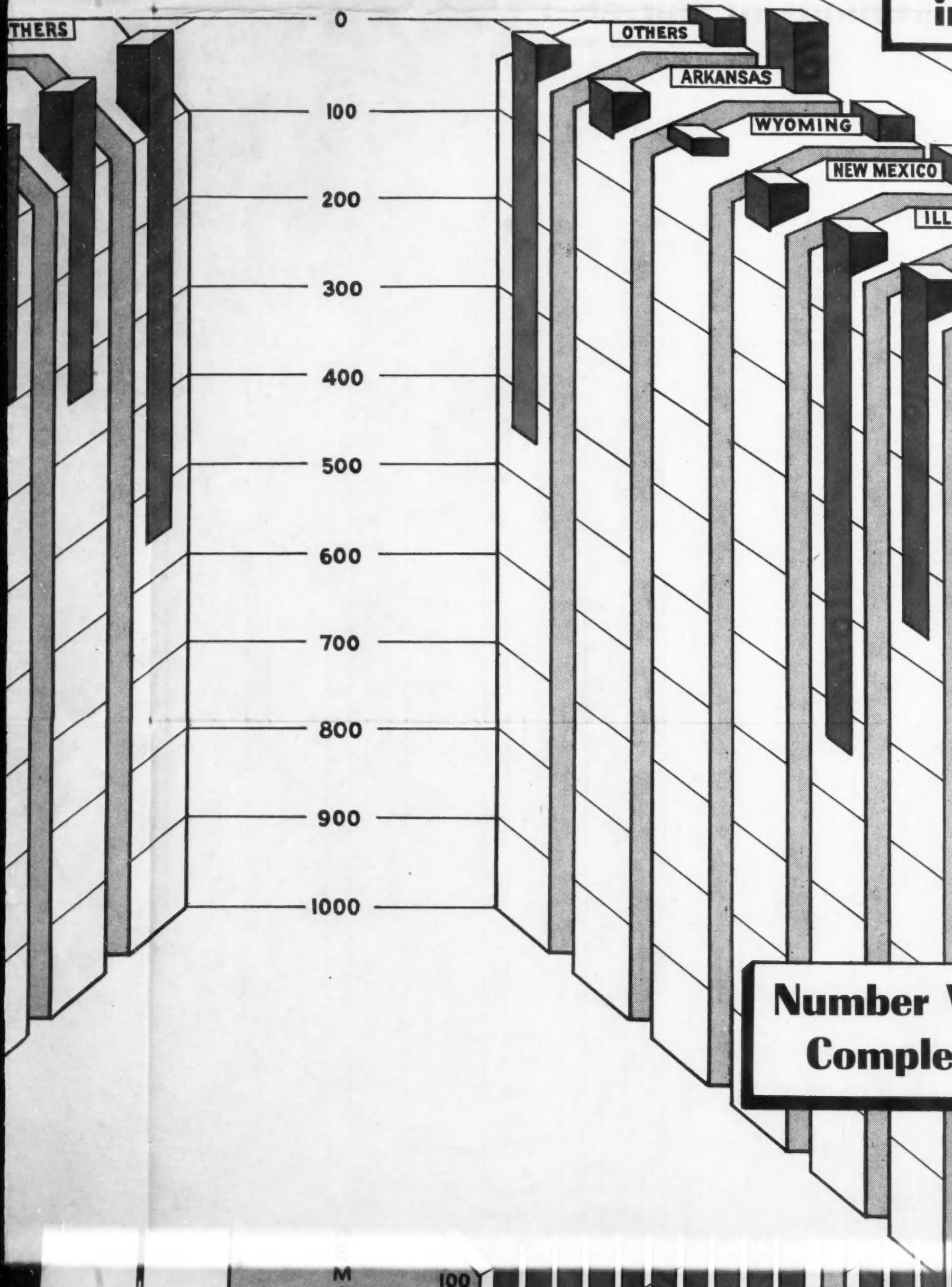
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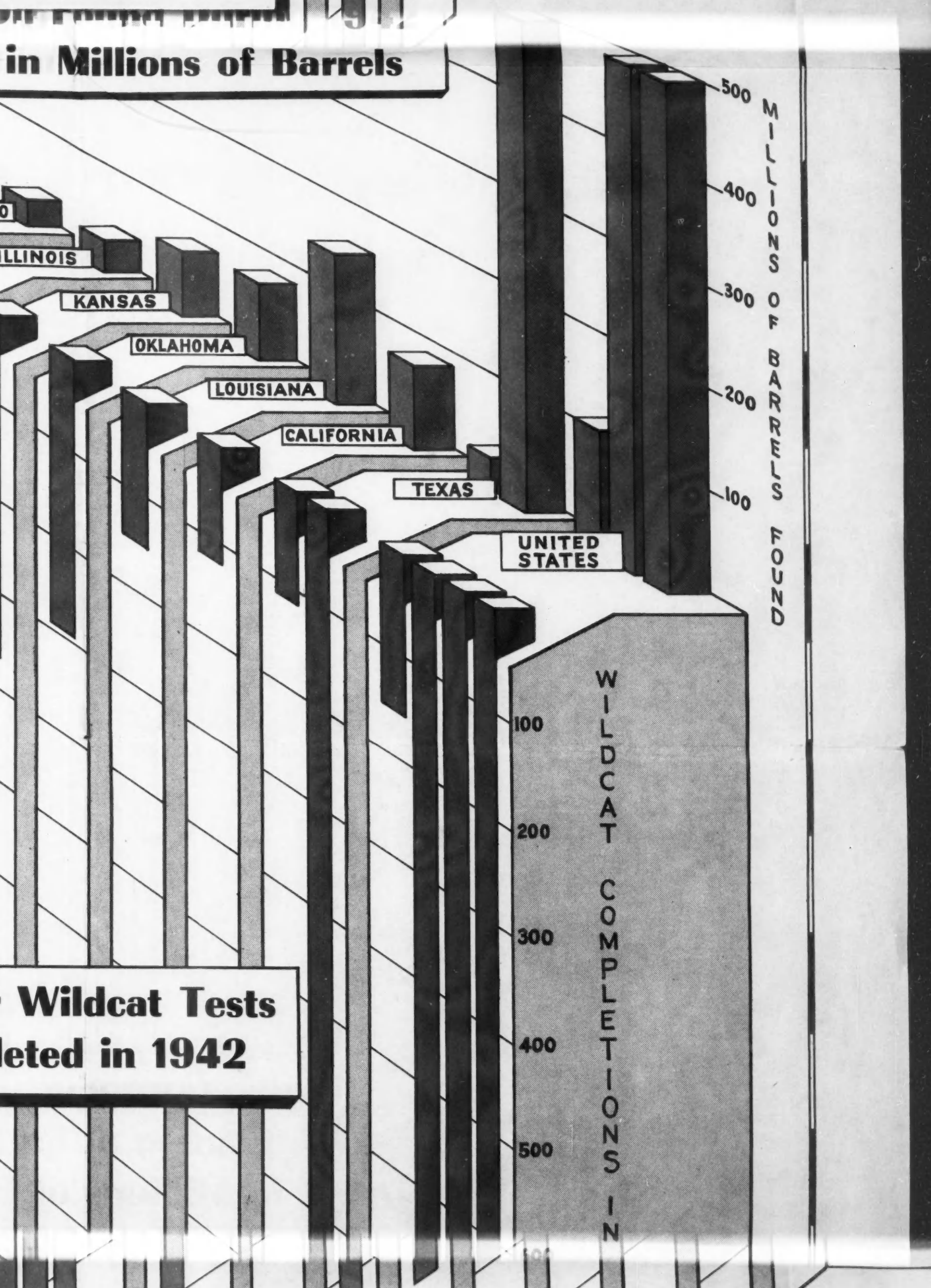

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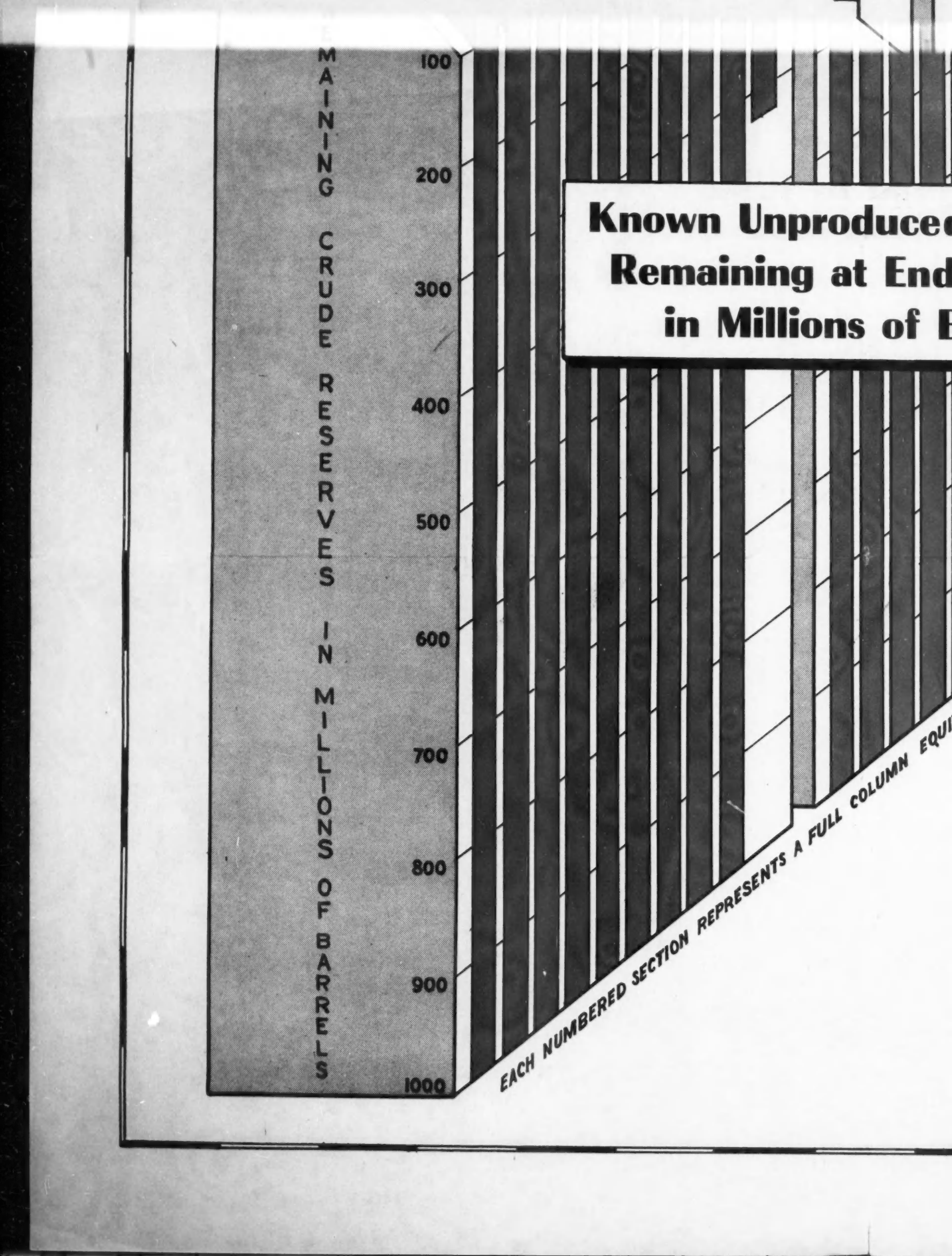
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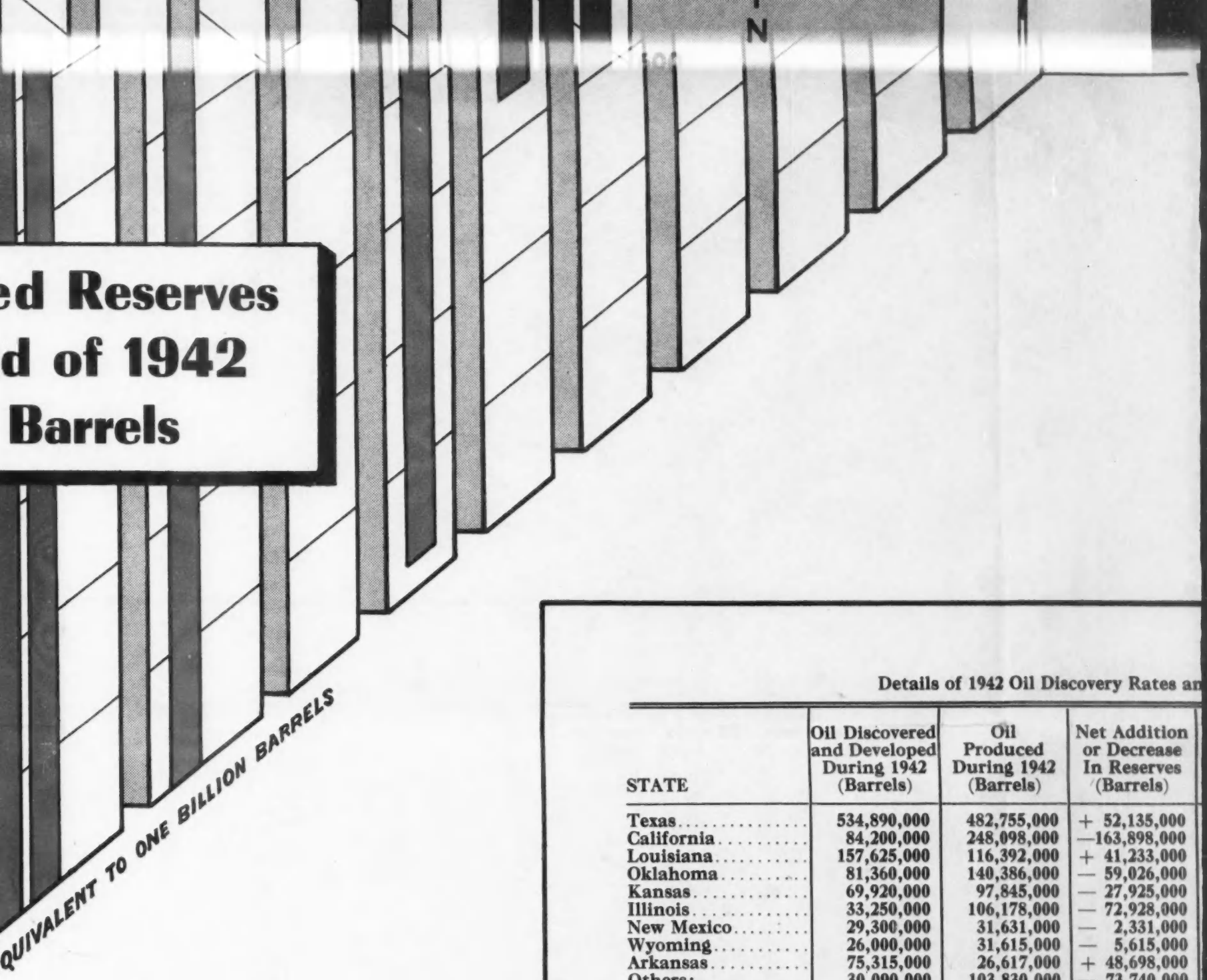


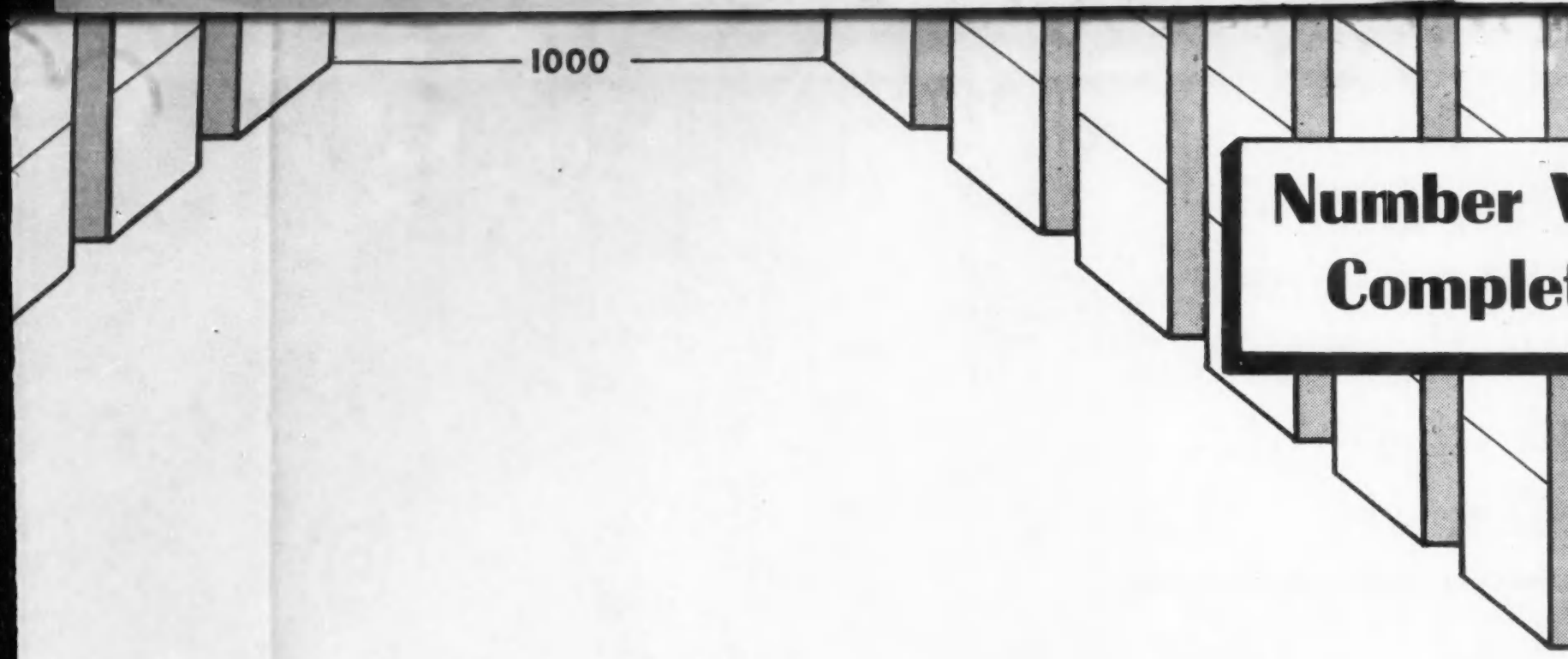
Details of 1942 Oil Discovery Rates an

STATE	Oil Discovered and Developed During 1942 (Barrels)	Oil Produced During 1942 (Barrels)	Net Addition or Decrease In Reserves (Barrels)
Texas	534,890,000	482,755,000	+ 52,135,000
California	84,200,000	248,098,000	—163,898,000
Louisiana	157,625,000	116,392,000	+ 41,233,000
Oklahoma	81,360,000	140,386,000	— 59,026,000
Kansas	69,920,000	97,845,000	— 27,925,000
Illinois	33,250,000	106,178,000	— 72,928,000
New Mexico	29,300,000	31,631,000	— 2,331,000
Wyoming	26,000,000	31,615,000	— 5,615,000
Arkansas	75,315,000	26,617,000	+ 48,698,000
Others:	30,090,000	103,830,000	— 73,740,000
Colorado	400,000	2,246,000	— 1,846,000
Indiana	3,000,000	6,744,000	— 3,744,000
Kentucky	6,500,000	4,198,000	+ 2,302,000
Michigan	7,385,000	21,761,000	— 14,376,000
Mississippi	2,500,000	28,761,000	— 26,261,000
Montana	1,600,000	8,095,000	— 6,495,000
Nebraska	55,000	1,267,000	— 1,212,000
New York	1,000,000	5,451,000	— 4,451,000
Ohio	3,500,000	3,599,000	— 99,000
Pennsylvania	2,500,000	17,984,000	— 15,484,000
West Virginia	1,500,000	3,663,000	— 2,163,000
*Miscellaneous	150,000	61,000	+ 89,000
TOTAL U. S.	1,121,950,000	1,385,347,000	—263,397,000

‡Based upon total oil found (discovered and developed) so merely represents wildcats.

†Includes 6 distillate wells in Texas, 6 distillate wells in Louisiana and 3 distillat

*Utah, Tennessee, Missouri, Virginia, in reserve figures, plus Arizona, Florida

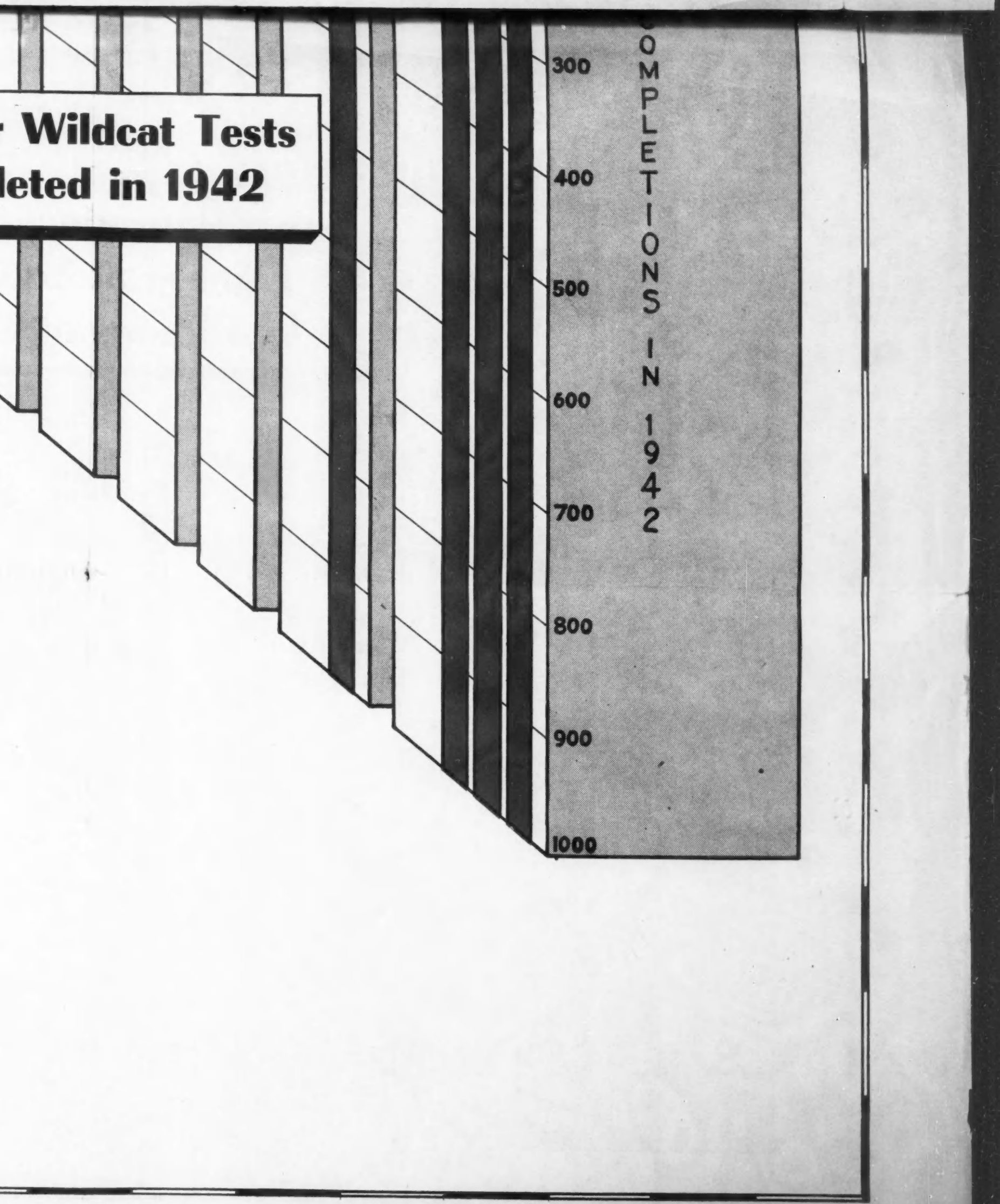


Details of 1942 Oil Discovery Rates and Current Petroleum Reserve Volume by States

Oil Discovered and Developed During 1942 (Barrels)	Oil Produced During 1942 (Barrels)	Net Addition or Decrease In Reserves (Barrels)	Proved Reserves Remaining End of 1942 (Barrels)	Percent of Nation's Reserves	Wildcat Completions				Barrels Found or Proven per Wildcat‡
					Total	Oil	Gas	Dry	
534,890,000	482,755,000	+ 52,135,000	11,027,776,000	57.1	1112	†182	21	909	481,016
84,200,000	248,098,000	—163,898,000	3,159,249,000	16.3	122	6	0	116	690,163
157,625,000	116,392,000	+ 41,233,000	1,371,367,000	7.1	152	†41	5	106	1,037,006
81,360,000	140,386,000	— 59,026,000	976,794,000	5.1	296	50	12	234	274,864
69,920,000	97,845,000	— 27,925,000	661,870,000	3.4	369	48	5	316	189,485
33,250,000	106,178,000	— 72,928,000	260,786,000	1.3	541	80	5	456	61,460
29,300,000	31,631,000	— 2,331,000	672,486,000	3.5	50	6	2	42	586,000
26,000,000	31,615,000	— 5,615,000	298,438,000	1.5	14	6	2	6	1,857,143
75,315,000	26,617,000	+ 48,698,000	343,715,000	1.8	51	†6	1	44	1,476,764
30,090,000	103,830,000	— 73,740,000	553,418,000	2.9	459	41	4	414	65,555
400,000	2,246,000	— 1,846,000	21,597,000	.1	3	0	0	3	133,333
3,000,000	6,744,000	— 3,744,000	19,129,000	.1	116	14	0	102	25,862
6,500,000	4,198,000	+ 2,302,000	38,752,000	.2	39	6	0	33	166,667
7,385,000	21,761,000	— 14,376,000	41,244,000	.2	180	17	2	161	41,028
2,500,000	28,761,000	— 26,261,000	53,946,000	.3	56	1	0	55	44,643
1,600,000	8,095,000	— 6,495,000	79,629,000	.4	7	2	2	3	228,571
55,000	1,267,000	— 1,212,000	2,802,000	.0	15	0	0	15	3,667
1,000,000	5,451,000	— 4,451,000	55,365,000	.3	....	...	..	....	.....
3,500,000	3,599,000	— 99,000	37,305,000	.2	....	...	..	....	.....
2,500,000	17,984,000	— 15,484,000	155,413,000	.8	....	...	..	....	.....
1,500,000	3,663,000	— 2,163,000	47,848,000	.3	....	...	..	....	.....
150,000	61,000	+ 89,000	388,000	.0	43	1	0	42	3,488
1,121,950,000	1,385,347,000	—263,397,000	19,325,899,000	100.0	3166	466	57	2643	354,374

nd (discovered and developed) so merely represents a means of gauging relative efficiency between states and not volume found by individual

n Texas, 6 distillate wells in Louisiana and 3 distillate wells in Arkansas.
, Virginia, in reserve figures, plus Arizona, Florida and Georgia in wildcat columns.


Wildcat Tests
leted in 1942
300
400
500
600
700
800
900
1000
OMPLETIONS IN 1942